S. HRG. 98-1040

DEPARTMENT OF ENERGY FISCAL YEAR 1985 NATIONAL SECURITY PROGRAMS AUTHORIZATION

HEARING

BEFORE THE

SUBCOMMITTEE ON
STRATEGIC AND THEATER NUCLEAR FORCES

OF THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

SECOND SESSION

ON

S. 2459

TO AUTHORIZE APPROPRIATIONS FOR THE DEPARTMENT OF ENERGY FOR NATIONAL SECURITY PROGRAMS FOR FISCAL YEAR 1985 AND FISCAL YEAR 1986, AND FOR OTHER PURPOSES

MARCH 27, 1984

Printed for the use of the Committee on Armed Services

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DEPARTMENT OF ENERGY FISCAL YEAR 1985 NATIONAL SECURITY PROGRAMS AUTHORIZATION

TUESDAY, MARCH 27, 1984

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The subcommittee met in executive session, at 2:15 p.m., pursuant to notice, in room SR-232A, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Nunn, Exon, Levin, and Bingaman.

Staff present: Robert F. Bott, George K, Johnson, Jr., James C. Smith III, professional staff members; Marie Fabrizio Dickinson, staff assistant; and Douglas R. Graham, research assistant.

Also present: Mark J. Albrecht, assistant to Senator Wilson; Peter D. Lennon, assistant to Senator Levin; and Edward McGaffigan, Jr., assistant to Senator Bingaman.

[The bill S. 2459 follows:]

II

98TH CONGRESS
2D SESSION

S. 2459

A BILL

To authorize appropriations for the Department of Energy for national security programs for fiscal year 1985 and fiscal year 1986, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Security Programs Authorization Act for Fiscal Years 1985 and 1986."

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TITLE I—NATIONAL SECURITY PROGRAMS

OPERATING EXPENSES

SEC. 101. Funds are authorized to be appropriated to the Department of Energy for fiscal year 1985 for operating expenses incurred in carrying out national security programs (including scientific research and development in support of the armed forces, strategic and critical materials necessary for the common defense, and military applications of nuclear energy and related management and support activities) as follows:

(1) For naval reactors development, $426,400,000.

(2) For weapons activities, $3,496,754,000.

(3) For verification and control technology, $73,700,000.

(4) For materials production, $1,493,590,000.

(5) For defense waste and byproducts management, $358,700,000.

(6) For Nuclear safeguards and security, $58,000,000.

(7) For security investigations, $34,000,000.

PLANT AND CAPITAL EQUIPMENT

SEC. 102. Funds are authorized to be appropriated to the Department of Energy for fiscal year 1985 for plant and capital equipment (including planning, construction, acquisi-

tion, and modification of facilities, land acquisition related thereto, and acquisition and fabrication of capital equipment not related to construction) necessary for national security programs as follows:

(1) For naval reactors development:

Project 85–N–101, general plant projects, various locations, $2,000,000.

Project 82–N–111, materials facility, Savannah River, South Carolina, $40,000,000, for a total project authorization of $165,000,000.

Project 81–T–112, modifications and additions to prototype facilities, various locations, $6,000,000, for a total project authorization of $110,000,000.

(2) For weapons activities:

Project 85–D–101, general plant projects, various locations, $31,600,000.

Project 85–D–111, general plant projects, various locations, $32,200,000.

Project 85–D–102, nuclear weapons research, development, and testing facilities revitalization, phase I, various locations, $56,600,000.

Project 85–D–103, safeguards and security enhancements, Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore, California, $4,700,000.

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Project 85–D–104, test devices assembly building, Los Alamos National Laboratory, Los Alamos, New Mexico, $800,000.

Project 85–D–105, combined device assembly facility, Nevada Test Site, Nevada, $3,000,000.

Project 85–D–106, hardened radiography facility, site 300, Lawrence Livermore National Laboratory, Livermore, California $800,000.

Project 85–D–112, enriched uranium recovery improvements, Y–12 Plant, Oak Ridge, Tennessee, $4,500,000.

Project 85–D–113, power plant and steam distribution system, Pantex Plant, Amarillo, Texas, $4,500,000.

Project 85–D–114, safeguards vaults, Y–12 Plant, Oak Ridge, Tennessee, $3,100,000.

Project 85–D–115, renovate plutonium building utility systems, Rocky Flats Plant, Golden, Colorado, $5,800,000.

Project 85–D–121, air and water pollution control facilities, Y–12 Plant, Oak Ridge, Tennessee, $5,000,000.

Project 85–D–122, safeguards and site security upgrade, Mound Facility, Miamisburg, Ohio, $2,700,000.

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Project 85–D–123, safeguards and site security upgrade, phase I, Pantex Plant, Amarillo, Texas, $1,000,000.

Project 85–D–124, safeguards and site security upgrade, Rocky Flats, Golden, Colorado, $1,000,000.

Project 85–D–125, tactical bomb production facilities, various locations, $10,000,000.

Project 84–D–102, radiation-hardened integrated circuit laboratory, Sandia National Laboratories, Albuquerque, New Mexico, $20,000,000, for a total project authorization of $22,000,000.

Project 84–D–103, hardened central guard force facility, Los Alamos National Laboratory, Los Alamos, New Mexico, $5,600,000, for a total project authorization of $6,200,000.

Project 84–D–104, nuclear materials storage facility, Los Alamos National Laboratory, Los Alamos, New Mexico, $6,500,000, for a total project authorization of $7,200,000.

Project 84–D–105, safeguards and security upgrades, phase I, Los Alamos National Laboratory, Los Alamos, New Mexico, $10,100,000, for a total project authorization of $15,100,000.

Project 84–D–106, security system upgrade, Sandia National Laboratories, Albuquerque, New

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Mexico, $2,300,000, for a total project authorization of $3,800,000.

Project 84–D–107, nuclear testing facilities revitalization, various locations, $34,900,000, for a total project authorization of $58,400,000.

Project 84–D–112, TRIDENT II warhead production facilities, various locations, $60,700,000, for a total project authorization of $80,000,000.

Project 84–D–113, antisubmarine warfare/standoff weapon warhead production facilities, various locations, $15,000,000.

Project 84–D–114, consolidated manufacturing facility, Rocky Flats Plant, Golden, Colorado, $21,100,000, for a total project authorization of $45,200,000.

Project 84–D–115, electrical system expansion, Pantex Plant, Amarillo, Texas, $10,000,000, for a total project authorization of $11,500,000.

Project 84–D–117, inert assembly and test facility, Pantex Plant, Amarillo, Texas, $11,700,000, for a total project authorization of $13,200,000.

Project 84–D–118, high-explosive subassembly facility, Pantex Plant, Amarillo, Texas, $40,000,000, for a total project authorization of $47,000,000.

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Project 84–D–119, railroad track replacement and upgrade, Pantex Plant, Amarillo, Texas, $6,800,000, for a total project authorization of $7,600,000.

Project 84–D–120, explosive component test facility, Mound Facility, Miamisburg, Ohio, $16,900,000, for a total project authorization of $20,000,000.

Project 84–D–121, safeguards and site security upgrading, Rocky Flats Plant, Golden, Colorado, $11,200,000, for a total project authorization of $21,200,000.

Project 84–D–124, environmental improvements, Y–12 Plant, Oak Ridge, Tennessee, $21,400,000, for a total project authorization of $29,000,000.

Project 84–D–211, safeguards and site security upgrading, Y–12 Plant, Oak Ridge, Tennessee, $8,000,000, for a total project authorization of $15,500,000.

Project 84–D–212, safeguards and site security upgrade, Pinellas Plant, Florida, $2,700,000, for a total project authorization of $3,700,000.

Project 83–D–124, standard missile-2 (SM–2) warhead production facilities, various locations, $9,000,000, for a total project authorization of $11,000,000.

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Project 83-D-199, buffer land acquisition, Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore, California, $17,000,000, for a total project authorization of $24,000,000.

Project 82-D-107, utilities and equipment restoration, replacement and upgrade, phase III, various locations, $175,100,000, for a total project authorization of $580,500,000.

Project 82-D-111, interactive graphics systems, various locations, $6,800,000, for a total project authorization of $20,000,000.

Project 82-D-144, simulation technology laboratory, Sandia National Laboratories, Albuquerque, New Mexico, $16,500,000, for a total project authorization of $28,700,000.

Project 82-D-146, weapons production and production support facilities, various locations, $10,000,000, for a total project authorization of $60,030,000.

Project 82-D-150, weapons materials research and development facility, Lawrence Livermore National Laboratory, Livermore, California, $16,800,000, for a total project authorization of $27,200,000.

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Project 81–D–101, particle beam fusion accelerator-II, Sandia National Laboratories, Albuquerque, New Mexico, $3,500,000, for a total project authorization of $45,650,000.

Project 81–D–115, missile X warhead production facilities, various locations, $20,900,000, for a total project authorization of $125,000,000.

Project 81–D–120, control of effluents and pollutants, Y–12 Plant, Oak Ridge, Tennessee, $1,400,000, for a total project authorization of $7,800,000.

Project 81–D–134, earthquake damage restoration, Sandia National Laboratories, Livermore, California, $4,900,000, for a total project authorization of $8,600,000.

Project 79–7–0, universal pilot plant, Pantex Plant, Amarillo, Texas, $3,800,000, for a total project authorization of $15,900,000.

(3) For verification and control technology:

Project 85–D–171, space science laboratory, Los Alamos, New Mexico, $1,000,000.

(4) For materials production:

Project 85–D–131, general plant projects, various locations, $32,000,000.

Project 85–D–132, plant engineering and design, various locations, $2,000,000.

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Project 85–D–136, components protection system, 100–N area, Richland, Washington, $3,300,000.

Project 85–D–137, vault safety special nuclear material inventory system, Richland, Washington, $2,500,000.

Project 85–D–139, fuel processing restoration, Idaho Fuels Processing Facility, Idaho National Engineering Laboratory, Idaho, $10,000,000.

Project 85–D–140, productivity and radiological improvements, Feed Materials Productions Center, Fernald, Ohio, $6,000,000.

Project 85–D–142, U_3O_8 fuel tube facilities, fuel preparation area, Savannah River, South Carolina, $8,000,000.

Project 85–D–145, uranyl nitrate to oxide conversion facility, Savannah River, South Carolina, $1,800,000.

Project 84–D–130, modification processing facility substations, Savannah River, South Carolina, $200,000, for a total project authorization of $5,800,000.

Project 84–D–134, safeguards and security improvements, Plantwide, Savannah River, South Carolina, $14,900,000, for a total project authorization of $26,900,000.

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Project 84–D–136, enriched uranium conversion facility modifications, Y–12 Plant, Oak Ridge, Tennessee, $8,000,000 for a total project authorization of $12,400,000.

Project 84–D–137, facility security systems upgrade, Idaho Fuels Processing Facility (IFPF), Idaho National Engineering Laboratory, Idaho, $8,000,000, for a total project authorization of $10,000,000.

Project 83–D–146, water pollution control, Feed Materials Production Center, Fernald, Ohio, $4,100,000, for a total project authorization of $9,500,000.

Project 83–D–147, pollution discharge elimination, Savannah River, South Carolina, $2,150,000, for a total project authorization of $8,650,000.

Project 83–D–148, nonradioactive hazardous waste management, Savannah River, South Carolina, $11,500,000, for a total project authorization of $19,000,000.

Project 83–D–180, facility storage modifications, various locations, $6,500,000, for a total project authorization of $15,800,000.

Project 82–D–124, restoration of production capabilities, phases II, III, IV, and V, various locations,

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$72,800,000, for a total project authorization of $304,634,000.

Project 82–D–128, plant perimeter security systems upgrade, Idaho Fuels Processing Plant, Idaho National Engineering Laboratory, Idaho, $400,000, for a total project authorization of $5,400,000.

Project 82–D–136, fuel processing facilities upgrade, Idaho Fuels Processing Facility, Idaho National Engineering Laboratory, Idaho, $1,000,000, for a total project authorization of $46,000,000.

Project 82–D–201, special plutonium recovery facilities, JB-Line, Savannah River, South Carolina, $28,800,000, for a total project authorization of $65,800,000.

(5) For defense waste and byproducts management:

Project 85–D–156, general plant projects, interim waste operations and long-term waste management technology, various locations, $25,645,000.

Project 85–D–157, seventh calcined solids storage facility, Idaho Chemical Processing Plant, Idaho National Engineering Laboratory, Idaho, $7,000,000.

Project 85–D–158, central warehouse upgrade, Richland, Washington, $700,000.

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Project 85–D–159, new waste transfer facilities, H Area, Savannah River, South Carolina, $11,000,000.

Project 85–D–160, test reactor area security system upgrade, Idaho National Engineering Laboratory (INEL), Idaho, $2,000,000.

Project 83–D–157, additional radioactive waste storage facilities, Richland, Washington, $3,155,000, for a total project authorization of $53,155,000.

Project 81–T–105, defense waste processing facility, Savannah River, South Carolina, $238,000,000, for a total project authorization of $440,000,000.

Project 77–13–f, waste isolation pilot plant, Delaware Basin, Southeast, New Mexico, $61,100,000, for a total project authorization of $404,200,000.

(6) For capital equipment not related to construction—

(A) for naval reactors development, $22,500,000;

(B) for weapons activities, $271,350,000;

(C) for verification and control technology, $2,000,000;

(D) for materials production, $128,660,000;

(E) for defense waste and byproducts management, $35,771,000; and

(F) for nuclear safeguards and security, $4,700,000.

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TITLE II—GENERAL PROVISIONS

REPROGRAMING

SEC. 202. Except as otherwise provided in this Act—

(1) no amount appropriated pursuant to this Act may be used for any program in excess of 105 per centum of the amount authorized for that program by this Act or $10,000,000 more than the amount authorized for that program by this Act, whichever is the lesser, and

(2) no amount appropriated pursuant to this Act may be used for any program which has not been presented to, or requested of, the Congress,

unless the Secretary of Energy (hereinafter in this title referred to as the "Secretary") transmits to the appropriate committees of Congress a full and complete statement of the action proposed to be taken with respect to the program and the facts and circumstances relied upon in support of the proposed action.

LIMITS ON GENERAL PLANT PROJECTS

SEC. 202. (a) The Secretary may carry out any construction project under the general plant projects provisions authorized by this Act if the total estimated cost of the construction project does not exceed $1,200,000.

(b) If at any time during the construction of any general plant project authorized by this Act, the estimated cost of the

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project is revised because of unforeseen cost variations and the revised cost of the project exceeds $1,200,000, the Secretary shall immediately furnish a complete report to the appropriate committees of Congress explaining the reasons for the cost variation.

LIMITS ON CONSTRUCTION PROJECTS

SEC. 203. (a) Whenever the current estimated cost of a construction project which is authorized by section 102 of this Act, or which is in support of national security programs of the Department of Energy and was authorized by any previous Act, exceeds by more than 25 per centum the higher of (1) the amount authorized for the project, or (2) the amount of the total estimated cost for the project as shown in the most recent budget justification data submitted to Congress, construction may not be started or additional obligations incurred in connection with the project above the total estimated cost, as the case may be, unless a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three days to a day certain) has passsed after receipt by the appropriate committees of the Congress of written notice from the Secretary containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of the action.

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(b) Subsection (a) shall not apply to any construction project which has a current estimated cost of less than $5,000,000.

FUND TRANSFER AUTHORITY

SEC. 204. To the extent specified in appropriation Acts, funds appropriated pursuant to this Act may be transferred to other agencies of the Government for the performance of the work for which the funds were appropriated, and funds so transferred may be merged with the appropriations of the agency to which the funds are transferred.

AUTHORITY FOR CONSTRUCTION DESIGN

SEC. 205. (a) Within the amounts authorized by this Act for plant engineering and design, the Secretary may carry out advance planning and construction designs (including architectural and engineering services) in connection with any proposed construction project.

(b) In any case in which the total estimated cost for such planning and design exceeds $1,000,000, the Secretary shall notify the appropriate committees of Congress in writing of the details of the project at least thirty days before any funds are obligated for design services for the project.

AUTHORITY FOR EMERGENCY CONSTRUCTION DESIGN

SEC. 206. In addition to the advance planning and construction design authorized by section 102, the Secretary may perform planning and design utilizing available funds for

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any Department of Energy national security program construction project whenever the Secretary determines that the design must proceed expeditiously in order to meet the needs of national defense or to protect property or human life.

FUNDS AVAILABLE FOR ALL NATIONAL SECURITY PROGRAMS OF THE DEPARTMENT OF ENERGY

SEC. 207. Subject to the provisions of appropriation Acts, amounts appropriated pursuant to this Act for management and support activities and for general plant projects are available for use, when necessary, in connection with all national security programs of the Department of Energy.

ADJUSTMENTS FOR PAY INCREASES

SEC. 208. Appropriations authorized by this Act for salary, pay, retirement or other benefits for Federal employees may be increased by such amounts as may be necessary for increases in benefits authorized by law.

AVAILABILITY OF FUNDS

SEC. 209. When so specified in an appropriation Act, amounts appropriated for "Operating Expenses" or for "Plant and Capital Equipment" may remain available until expended.

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CONTRACTOR LIABILITY FOR INJURY OR LOSS OF PROPERTY ARISING OUT OF ATOMIC WEAPONS TESTING PROGRAMS

SEC. 210. (a) The remedy against the United States provided by sections 1346(b) and 2672 of title 28, United States Code, or by sections 741–752 or 781–790 of title 46, United States Code, as appropriate, for injury or loss of property or personal injury or death shall apply to any civil action for injury or loss of property or personal injury or death due to exposure to radiation based on acts or omissions by a contractor in carrying out a contract in the conduct of the United States atomic weapons testing program. This remedy shall be exclusive of any other civil action or proceeding for the purpose of determining civil liability arising from any act or omission of the contractor without regard to when the act or omission occurred. The employees of such a contractor shall be considered to be employees of the Federal Government, as provided in section 2671 of title 28, United States Code, for the purposes of any such civil action or proceeding and the civil action or proceeding shall proceed in the same manner as any action against the United States filed pursuant to section 1346(b) of such title and shall be subject to the limitations and exceptions applicable to those actions.

(b) A contractor against whom a civil action or proceeding described in subsection (a) is brought shall promptly de-

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liver all processes served upon that contractor to the Attorney General of the United States. Upon certification by the Attorney General that the suit against the contractor is within the provisions of subsection (a), a civil action or proceeding commenced in a State court shall be removed without bond at any time before trail by the Attorney General to the district court of the United States for the district and division embracing the place wherein it is pending and the proceedings shall be deemed a tort action brought against the United States under the provisions of section 1346(b), 2401(b), or 2402, or sections 2671 through 2680 of title 28, United States Code. For purposes of removal, the certification by the Attorney General under this subsection establishes contractor status conclusively.

(c) The provisions of this section shall apply to any action now pending or hereafter commenced which is an action within the provisions of subsection (a) of this section. Notwithstanding section 2401(b) of title 28, United States Code, if a civil action or proceeding pending on the date of enactment of this section is dismissed because the plaintiff in such action or proceeding did not file an administrative claim as required by section 2672 of that title, the plaintiff in that action or proceeding shall have thirty days from the date of the dismissal or two years from the date upon which the claim accrued, whichever is later, to file an administrative

claim and any claim or subsequent civil action or proceeding shall thereafter be subject to the provisions of section 2401(b) of title 28.

(d) For purposes of this section, "contractor" includes a contractor or cost reimbursement subcontractor of any tier participating in the conduct of the United States atomic weapons testing program for the Department of Energy (or its predecessor agencies, including the Manhattan Engineer District, the Atomic Energy Commission, and the Energy Research and Development Administration). "Contractor" also includes facilities which conduct or have conducted research concerning health effects of ionizing radiation in connection with the testing under contract with the Department of Energy (or its predecessor agencies).

TITLE III— AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 1986

SEC. 301. There are authorized to be appropriated to the Department of Energy to be available not earlier than October 1, 1985, such sums as may be necessary for fiscal year 1986 for programs set forth in this Act.

O

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. My colleagues, ladies and gentlemen, we are opening today's session at this time.

In looking out at the familiar faces, I think all of us will reflect on the contributions made by our late distinguished colleague, Senator Jackson.

When I first came to the Senate, he was among those who extended the warmest of welcomes and who urged me to become acquainted with this particular program.

As I reflect back, it was my privilege to go to the floor representing my side of the aisle on each of the occasions during the last 5 years, and in the past administration. In all honesty, it was the distinguished Senator who made the decisions on all of these programs in the past years, and I feel a little inadequate today that he is not here with us.

The purpose of the hearing this afternoon is to receive testimony on the fiscal year 1985 budget for the defense programs funded by the Department of Energy.

All witnesses and members of course are aware that we are in executive session and will remain so throughout the hearing, unless there is a special request by any of my colleagues.

We have two panels of witnesses. The first includes Mr. Robert Morgan, the Principal Deputy Assistant Secretary of Energy for Defense Programs, and Dr. Richard Wagner, the Assistant to the Secretary of Defense for Atomic Energy.

The second panel will consist of the laboratory directors: Dr. Roger Batzel from Livermore, Dr. Don Kerr from Los Alamos, and Dr. George Dacey, from Sandia.

We have been informally advised that Major General Hoover, who is here today to testify on weapons activities will soon retire with great distinction, and in all likelihood his nomination will come before the Senate very shortly to be the Assistant Secretary of Energy for Defense Programs.

We certainly congratulate you, General, and look forward to working with you after you are confirmed.

The budget request for DOE's defense programs for fiscal year 1985 is $7.8 billion, an increase of $1.2 billion over the amount appropriated in fiscal year 1984. While this represents an increase of 18 percent it is pretty much in line with the overall increase requested for DOD's strategic programs.

Now, my distinguished colleague and ranking minority Member, Senator Exon, I am sure you have some observations.

Senator EXON. Mr. Chairman, thank you very much.

Welcome, gentlemen. I will be very brief. I just want to add my name in support of the timely and pertinent remarks that the chairman made with regard to our departed colleague, Senator Jackson. I experienced similar good relationships with him when I first came here. When we get into things of this nature, we particularly miss him more than we do in other areas.

I would say to you, gentlemen, that I am looking forward to your testimony a great deal.

This subcommittee, in the indepth proceedings that we have launched into this and related areas, has brought to our attention some facts that are of concern to all of us with regard to our strength vis-a-vis the Soviet Union. We know that you all play a key and critical role in this area. Therefore, I am looking forward with great interest to your testimony and to the questions which we undoubtedly will have.

Thank you, Mr. Chairman.

Senator WARNER. Senator Levin?

Senator LEVIN. Mr. Chairman, other than wanting to associate myself with your remarks and those of Senator Exon relative to Scoop's not being here today. I do, though, want to commend you for reminding us of that. I think there is no more appropriate place in this hearing than in this particular subcommittee to remember Scoop. The tribute both you and Senator Exon have paid to him today is one with which I wish to be associated. I have nothing further to say and I pass.

Senator WARNER. I thank you, Senator. When I look back, I specifically remember that in three out of the 4 years that we went to the floor, this bill was discussed for a period of less than 15 minutes and then voice voted. That was a tribute to the confidence and the trust which reposed in Senator Jackson by all Senators for this subject.

Senator Bingaman, we certainly are privileged to have you as a member of the full committee attend the hearing of this subcommittee. You come from a State that makes a major contribution by way of its people in this work. I know you have worked hard to prepare yourself for this hearing.

We would be pleased to hear your comments.

Senator BINGAMAN. I really did not have an opening statement, Mr. Chairman. I am afraid that this year the bill may not be voice voted after 15 minutes, though. Perhaps it should be, but maybe it won't be.

Senator WARNER. All right. Thank you.

We welcome your close scrutiny which is of value in this as well as in many other areas.

Senator EXON. Mr. Chairman, before we proceed, may I just add a comment here.

I thought it was appropriate that you saluted our colleague, Senator Bingaman for the key role that his State plays in this area. I was wondering what action you have taken on my suggestion that we, in Nebraska, trade with the State of my friend at the end of the table, so that we will take this program and he can have the MX. Have you acted on that or not?

[General laughter.]

Senator WARNER. Well, I had substituted the Titan and the nuclear waste repository to the Senator.

Senator EXON. Then I yield.

[General laughter.]

Senator BINGAMAN. That is what we call an "imperfecting" amendment.

[General laughter.]

Senator WARNER. Gentlemen, you have waited patiently so please proceed.

STATEMENT OF ROBERT L. MORGAN, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF ENERGY FOR DEFENSE PROGRAMS, ACCOMPANIED BY MAJ. GEN. WILLIAM W. HOOVER [USAF], DEPUTY ASSISTANT SECRETARY OF ENERGY FOR MILITARY APPLICATION

Mr. MORGAN. Thank you, Mr. Chairman. We were also privileged by Senator Jackson's service and his dedication to this program.

Senator Jackson's long association with the nuclear weapons program began when, as a member of the 81st Congress in 1949, he was appointed to the Joint Committee on Atomic Energy. He served on this committee until its abolishment in 1977.[1] He provided expert leadership to ensure that the weapons program was at the forefront of technology. His strong desire for adequate protection of this country and for our strong deterrent capability was evident by Senator Jackson's actions. Following his commendable service on the Joint Committee, his strong commitment to a strong national defense continued with his service on the Senate Armed Services Committee. Senator Jackson provided a depth of knowledge that was vital to maintaining an effective overall nuclear weapons program. His understanding of our programs and his support for our objectives will be sorely missed by all of us in Defense Programs in the Department of Energy.

We are especially pleased that you, Mr. Chairman, were able to have the Trident submarine named for him. It is a fitting memorial to one who has been a national leader in the development of nuclear power for peaceful and defense purposes.

Senator WARNER. That was a unanimous decision of the Senate as a whole and the Department of Defense.

Mr. MORGAN. Yes, sir.

It is my privilege to be here to discuss the fiscal year 1985 program in the Defense Programs portion of the Department of Energy. I would like to submit written testimony for the record from myself, General Hoover, James Culpepper, and Dr. Gilbert.

Senator WARNER. We will accept those statements in full, and I presume you will address to the subcommittee those portions that you feel bear special mention.

Mr. MORGAN. Yes, sir.

OVERVIEW

I would like to take just a few minutes for a brief introduction and then will turn this over to Dr. Wagner. After his discussion I will go through a program summary.

Mr. MORGAN. Mr. Chairman, the defense mission that we have is to design, test, and manufacture all of the nuclear weapons in the U.S. stockpile, pursue the inertial fusion program in support of the military needs of the Nation, produce all nuclear materials required in the program, ensure the protection, control, and accountability of special nuclear materials, ensure the verification of international arms agreements and control the dissemination of classified information.

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[1] Public Law 95-110.

Our authority for that is the Atomic Energy Act of 1954, as amended, and annually we base our program on the Nuclear Weapons Stockpile Memorandum signed by the President.

FY 1984 SUPPLEMENTAL REQUEST
SUMMARY OF FUNDING
($'s IN MILLIONS)

PROGRAM COMPONENT	FY 1983 BUDGET AUTHORITY	FY 1984 BUDGET AUTHORITY	FY 1984 SUPPLEMENTAL REQUEST	FY 1984 TOTAL
WEAPONS ACTIVITIES				
RESEARCH, DEVELOPMENT & TESTING	$1,183.8	$1,380.2	$ 29.1	$1,409.3
INERTIAL CONFINEMENT FUSION	189.7	169.7	—	169.7
PRODUCTION & SURVEILLANCE	1,918.0	2,100.2	38.5	2,138.7
PROGRAM DIRECTION	52.5	57.5	—	57.5
SUBTOTAL	$3,343.8	$3,707.6	$ 66.6	$3,773.2
NUCLEAR MATERIALS				
MATERIALS PRODUCTION	1,319.9	1,535.9	85.8	1,621.7
DEFENSE WASTE & BYPRODUCTS MGMT.	518.7	681.1	—	681.1
SUBTOTAL	$1,838.6	$2,217.0	$ 85.8	$2,302.8
SECURITY AFFAIRS				
VERIFICATION & CONTROL TECHNOLOGY	53.9	61.7	6.2	67.9
SAFEGUARDS & SECURITY	47.4	52.0	—	52.0
SECURITY INVESTIGATIONS	28.5	29.5	—	29.5
SUBTOTAL	$ 129.8	$ 143.2	$ 6.2	$ 149.4
GRAND TOTAL DEFENSE PROGRAMS	$5,312.2	$6,067.8	$157.6	$6,225.4

DOE — DEFENSE PROGRAMS
FY 1985 BUDGET REQUEST
SUMMARY OF FUNDING
($ IN MILLIONS)

PROGRAM COMPONENT	FY 1984 BUDGET AUTHORITY	FY 1985 AUTHORIZATION	FY 1985 BUDGET AUTHORITY
WEAPONS ACTIVITIES			
RESEARCH, DEVELOPMENT & TESTING	$1,380.2	$1,723.2	$1,723.2
INERTIAL CONFINEMENT FUSION	169.7	138.0	138.0
PRODUCTION & SURVEILLANCE	2,138.2	2,804.6	2,621.7
PROGRAM DIRECTION	57.5	80.2	80.2
SUBTOTAL	3,707.6	4,536.9	4,543.1
NUCLEAR MATERIALS			
MATERIALS PRODUCTION	1,535.9	1,846.2	1,864.2
DEFENSE WASTE & BYPRODUCTS MGMT.	681.1	742.7	752.8
SUBTOTAL	2,217.0	2,588.9	2,617.0
SECURITY AFFAIRS			
VERIFICATION & CONTROL TECHNOLOGY	61.7	76.7	76.7
SAFEGUARDS & SECURITY	52.0	62.7	62.7
SECURITY INVESTIGATIONS	29.5	34.0	34.0
SUBTOTAL	143.2	173.4	173.4
PROPOSED FY 1984 SUPPLEMENTAL	157.6	—	—
GRAND TOTAL DEFENSE PROGRAMS	$6,225.4	$7,299.3	$7,333.5[a/]

[a/] EXCLUDES SAVINGS FROM MANAGEMENT INITIATIVES.

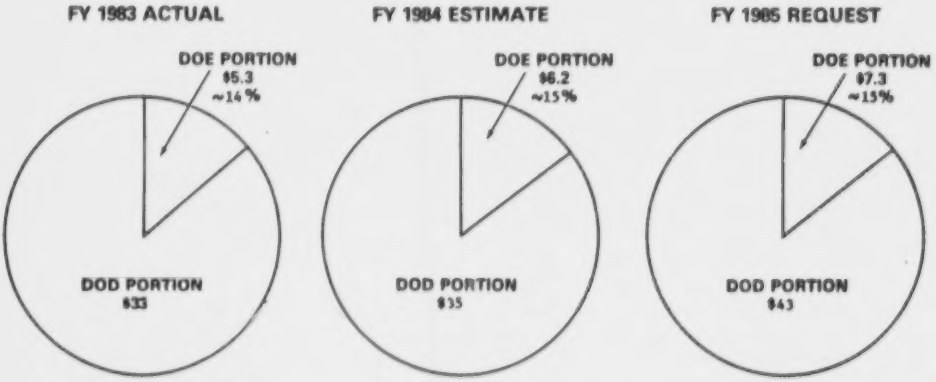
FISCAL YEAR 1984 SUPPLEMENTAL AUTHORIZATION

Mr. MORGAN. As you said earlier, the program budget has increased from last year's by $1.2 billion. What I have here is a slide of our supplemental request over the fiscal year 1984 authorization. We are requesting $157 million. The primary request is $64 million to increase our safeguards and security, $45 million to take care of environmental problems, $38 million for taxes, and $11 million for other activities.

FISCAL YEAR 1985 AUTHORIZATION REQUEST

Mr. MORGAN. For our fiscal year 1985 authorization, we are requesting $7.3 billion for program activities for which I am responsible. That does not include approximately $500 million for the naval reactors program.

TOTAL NUCLEAR WEAPON SYSTEMS BUDGET—DOD AND DOE
(B/A $ IN BILLIONS)



Mr. MORGAN. Here is a little perspective showing the portion of our budget compared to that for the total nuclear weapons systems.

In fiscal year 1983, our portion was $5.3 billion, or approximately 14 percent of the total system budget, in fiscal year 1984 it is 15 percent at $6.2 billion, and the DOD portion would be $35 billion; and in our current request, we are approximately 15 percent, at $7.3 billion.

Thank you.

Mr. Chairman, with your permission, I would like to submit for the hearing record my prepared statement, the prepared statement of Gen. William W. Hoover, USAF; Mr. James W. Culpepper, Deputy Assistant Secretary for Security Affairs; and F. Charles Gilbert, Deputy Assistant Secretary for Nuclear Materials of the Department of Energy.

[The prepared statements follow:]

PREPARED STATEMENT OF ROBERT L. MORGAN, DEPUTY ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

INTRODUCTION

Mr. Chairman and members of the Committee, it is my pleasure to be here today to share with you the rationale to support the Defense Programs portion of the Department of Energy's Atomic Energy Defense Activities authorization request for Fiscal Year 1985 and our Supplemental request for Fiscal Year 1984.

With me today are Dr. Richard Wagner, Assistant to the Secretary of Defense for Atomic Energy; Major General William W. Hoover, Deputy Assistant Secretary for Military Application; Dr. F. Charles Gilbert, Deputy Assistant Secretary for Nuclear Materials, Mr. James W. Culpepper, Deputy Assistant Secretary for Security Affairs; and Mr. Charles V. Boykin, Defense Programs newly appointed Deputy Assistant Secretary for Intelligence.

Mr. Boykin's intelligence organization, formerly part of the Defense Programs Office of International Security Affairs, is responsible for all Department of Energy intelligence activities. The intelligence organization is placed in Defense Programs because of its close working relationship with our Office of International Security Affairs and the weapons laboratories. Mr. Boykin will have direct access to the Office of the Secretary. Because of Mr. Boykin's very recent appointment, Mr. Culpepper will cover the intelligence budget request.

THE WHY OF DEFENSE PROGRAMS

The Department of Energy is responsible for designing, developing, testing, producing, and maintaining all of the United States' nuclear weapons in support of the Department of Defense, and the other supporting functions shown on this Chart. The Defense Department's requirements are coordinated with the Department of Energy to assure that we in DOE will be able to satisfy them; then these requirements are specifically approved by the President. This Department of Defense/Department of Energy/White House relationship is in accordance with the Atomic Energy Act of 1954, and the subsequent legislation establishing the Department of Energy.

Dr. Wagner, who will follow me in presenting his testimony, will elaborate further on the cooperative relationship between our two Departments.

ADJUSTING TO CHANGE

Because the work of our organization is vital to the national defense, we must strive to conduct our business in a manner that will prompt neither a negative public nor regulatory reaction which could threaten to compromise our ability to get the job done; we must manage our business in ways that we as citizens, would hope that other industrial operations would be managed.

This means our operations must be carried out in a secure, safe, and environmentally responsible manner. In addition, our operations must produce the required weapons quantities while meeting the stringent quality requirements that will assure their safety and reliability. All of our efforts must be managed efficiently and economically.

In recent years the operational standards against which we must work have been changing. The experience of the Three Mile Island incident has tightened the standards and practice for the operation of defense related reactors. The increasing world-wide incidence of terrorist activities has required that we enhance the physical security afforded nuclear materials in our sensitive facilities. Our ongoing efforts to effectively manage radioactivity since the inception of our program have paid off; but now, the adequacy of previously accepted industrial standards and practices for management of other chemicals and waste for the protection of the environment and the public is more and more coming into question.

We are adjusting to each of these changes in a careful, responsible way. We have reviewed our most critical facilities and operations to define areas needing improvement. We are continuing these studies throughout the Defense Programs complex. We have developed prioritized plans for addressing the identified deficiences. Our Fiscal Year 1984 supplemental request and our Fiscal Year 1985 budget request that we will justify to you, contain near-term priority upgrades necessary to correct known deficiencies. Our primary responsibility, however, is to produce and maintain the nuclear weapons stockpile in a safe, secure, and environmentally responsible manner.

THE ISSUES

In their testimony following my statement, the Defense Programs Deputy Assistant Secretaries will be describing their responsibilities and the manner in which they are addressed in the Fiscal Year 1985 budget and Fiscal Year 1984 supplemental request. They will cover the major issues and challenges before them, and they will address the security, safety, and environmental actions proposed and underway to assure the success of their programs.

General Hoover, the Deputy Assistant Secretary for Military Application, will address the reasons why in support of the Defense Department, we are engaged in a substantial effort to replace the older weapons in the United States arsenal with more advanced state-of-the-art systems along with some of the technical challenges involved in pursuing the President's Strategic Defense Initiative and other weapon developments.

Dr. Gilbert, the Deputy Assistant Secretary for Nuclear Materials, will discuss the reasons why the Department must continue to produce increased quantities of plutonium and tritium for the weapon program and the steps we are planning, to provide for responsible interim and long-term management of our radioactive waste.

Mr. Culpepper, the Deputy Assistant Secretary for Security Affairs, will discuss with you the issues associated with safeguards and security at our nuclear facilities, classification concerns and activities of the Verification and Control Technology program.

THE AUTHORIZATION REQUEST

Our Fiscal Year 1985 authorization request for Defense Programs totals $7.3 billion. In addition the request for the Fiscal Year 1984 Supplemental is $157.6 million. General Hoover, Dr. Gilbert, and Mr. Culpepper will explain in detail the specific requirements for their programs.

Because our work is in direct support of the United States military nuclear forces, it seems appropriate, for perspective, to compare the size of the Department's Defense Programs effort to the combined total of the nuclear force effort in the Department of Defense and in the Department of Energy. In that context, in Fiscal Year 1985, our budget request comprises about 15 percent of the total. In Fiscal Year 1984, the percentage is about 15 percent, and in Fiscal Year 1983, it was approximately 14 percent.

In the context of prior year budgets, our Fiscal Year 1985 request and the Fiscal Year 1984 supplemental may seem large. I suggest that in the context of the Department of Defense budget for nuclear weapon systems, our request is not only very reasonable, but it is also consistent with Congressional action in prior years.

While we are all concerned about budget deficits, our primary objective within Defense Programs is to provide the nuclear warheads to support the strategic posture of the Administration. We believe our budget request will continue to provide for balanced support of the Department of Defense.

I will be pleased to answer any questions the Committee may have.

PREPARED STATEMENT BY MAJ. GEN. WILLIAM W. HOOVER, USAF, DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION ON THE WEAPONS PROGRAM

INTRODUCTION

Mr. Chairman and Members of the Committee:

It is my pleasure to appear before this Committee once again to discuss the Department of Energy (DOE) fiscal year 1985 nuclear weapons and inertial confinement fusion programs and the funding necessary to carry out these programs.

In previous testimony I have drawn the analogy between the DOE nuclear weapons complex and a major, high-technology corporation. I would like to continue to do so. We are similar in that our corporate assets must be maintained and improved; our long-range planning must take into account economic and political issues as well as technological variables; and we must position ourselves for the future in an uncertain world. We are different in that our product line—nuclear warheads—is unique and we have but one customer, the Department of Defense (DOD). Most importantly, we are the sole source in the Nation for this product line. Were there to be an increased need for nuclear capabilities, we could not turn elsewhere because a private industrial base is not available. In that sense we are fundamental to national security, and I would caution that an adequate margin of both nuclear weapon production and research and development capacity must be main-

tained as a hedge against such a need. Our primary goal is to run the business efficiently, safely, and in an environmentally sound manner while ensuring the highest measure of safeguards and security. We realize there are disparate views about nuclear weapons. Whatever their views, our citizens have the right to be assured that, so long as we maintain a nuclear stockpile, the weapons and the facilities required for their design and production are safe, secure, and environmentally acceptable.

This is a time when the nuclear weapons program must be able to accommodate change and new ideas. The world events of the past year will affect our program directly or indirectly, both now and in the future. The nuclear freeze, arms control, and build-down proposals; the United States relationship within the North Atlantic Treaty Organization (NATO), the deployment of both the Pershing II and Ground-Launched Cruise Missile (GLCM) systems, and the issue of conventional versus nuclear battlefield weapons; the global effects of nuclear war, and the President's initiative on strategic defense all impact nuclear weapons research and development.

The primary purpose of our nuclear weapons is to deter a nuclear or major conventional attack against the United States or its allies. To deter such an attack, we maintain a stockpile of various types of nuclear weapons. We are continually replacing and modernizing rather than merely increasing the number of weapons in this stockpile. We have incorporated features such as insensitive high-explosive, and [deleted] which significantly reduce the chance of an explosion or dispersal of nuclear material in an abnormal environment such as an aircraft crash. Additional command and control features have also been included to prevent unauthorized personnel from using the weapons. This modernization of older weapons, together with new production, has enabled the United States to counter the nuclear buildup by the Soviets during the last 20 years.

Our investment strategy to provide a strong viable nuclear weapons complex as a linchpin of our nuclear deterrence guides us into the 1990s by ensuring sufficient manufacturing capacity to meet the current and planned production workload with some backup capability; enhancing capability in our national laboratories; increasing nuclear testing [deleted] restoring and revitalizing the physical plant; maintaining an effective stockpile improvement program; employing modern management and manufacturing techniques to meet the challenges of the 1980s and 1990s; and ensuring that the nuclear weapons complex is environmentally sound and that safety and security are of continuing primary concern.

I would like now to describe how this complex works; what we build; how we carry out our research, development, testing, and production responsibilities; and to review some new concepts that hold promise for the future.

ASSETS

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

This chart gives you an idea of the national scope of the nuclear weapons complex with major facilities located in 10 states and with an average fiscal year 1984 contractor employment of about 39,000. In these government-owned, contractor-operated facilities, there is a great diversity of equipment, including computer-controlled, automated machinery to increase productivity and reverse the trend toward obsolescence.

Unique capabilities are required to design, test, and manufacture United States nuclear weapons. The nuclear weapons complex includes three design laboratories, the Nevada Test Site (NTS), and seven production facilities. Of the three laboratories, the Los Alamos National Laboratory (LANL) and the Lawrence Livermore National Laboratory (LLNL) are responsible for nuclear design and the Sandia National Laboratories (SNL) are responsible for ordnance engineering. All three are broad-based, multiprogram laboratories with unique capabilities in the physical sciences and in engineering.

The NTS is the only location where we currently conduct nuclear explosions. All these tests are conducted underground in accordance with the provisions of the Limited Test Ban Treaty and the 150 kiloton (kt) yield limit of the Threshold Test Ban Treaty. [Deleted.]

The seven production facilities are located throughout the country and operate as an integrated industrial complex with all facilities responsible for production of specific weapon parts or components but only one facility responsibility for final assembly.

A comparison is often made between the nuclear weapons production complex and a large industrial organization. We do, indeed, share many similarities with industry in the private sector, but on closer examination we also find dissimilarities—dissimilarities that make the production complex unique. They arise as the result of technical factors, such as special materials and processes which are unavailable in private industry, and the necessity for stringent security standards. We also must operate at the frontier of high technology and in hazardous environments. This chart shows some examples of how we have begun to use the latest technological

advances to handle hazardous materials such as plutonium and to produce weapons components that meet extremely demanding specifications.

PRODUCT

In the broadest sense, our product is new ideas, techniques, designs, and processes from our research and development laboratories and fully assembled warheads from our weapons production complex.

Productivity increases continue to be a top management goal throughout the weapons complex. The effort involves both design and production elements. The investment made in restoration of the production facilities and acquisition of state-of-the-art capital equipment is increasing our ability to manufacture and design warhead components more economically, while refining manufacturing processes so as to decrease warhead costs. We have introduced extensive and detailed reviews, beginning at the subcomponent level, to insure that design intent is accommodated within the most cost effective manufacturing processes available. We have also established a formal mechanism with the DOD for commenting on the cost and producibility of weapons features with a view toward further reducing weapons system costs. Because of these and other actions, the trend in our index of productivity has been positive, resulting in a lowered, cost per nominal warhead produced. We expect this trend to continue as our use of computer-aided design/computer-aided manufacturing (CAD/CAM), robotics, and flexible machining systems increases within the complex.

The nuclear weapons presently being developed or produced, and for which FY 1985 funds are requested, can be divided into four distinct mission categories—Strategic, Long-Range Theater, Battlefield, and Fleet Defense.

STRATEGIC WEAPONS

The strategic warheads in development or production are the W76 warhead for the Trident I Submarine-Launched Ballistic Missile (SLBM), the W80-1 warhead for the Air-Launched Cruise Missile (ALCM), the B83 Strategic Bomb, the W87 warhead for Peacekeeper, and the warhead for the Trident II SLBM.

Production of W76 warheads is progressing [deleted].

Deliveries of W80-1 warheads for the ALCM began in fiscal year 1982, and these missiles are now standing alert on B-52 bombers in the continental United States.

The B83 Strategic Bomb went into production in June 1983. It is intended to replace the present B28 and B43 bombs which were developed in the 1950s. It incorporates the latest advances in nuclear weapons safety, [deleted] and multiple-delivery and fuzing options. The B83 is compatible with the B-52 and FB-111 aircraft of the Strategic Air Command and will also be compatible with the B1-B.

The W87 warhead for Peacekeeper will be in production engineering in FY 1985 with an initial operational capability (IOC) date of December 1986. The $20.9 million in the budget request will complete the DOE total estimated cost (TEC) capital funding for the W87. This warhead is also being considered as the baseline design for the small mobile International Ballistic Missile, the so-called "Midgetman," recommended by the Scowcroft panel.

We are just beginning engineering development of the warhead for the Trident II SLBM. A new, high-yield warhead and reentry body are being developed for the more powerful D5 missile that will be carried on Ohio-class Trident submarines. The Trident II system will have an IOC date of December 1989.

LONG-RANGE THEATER

In the long-range theater category, we have one bomb and three warhead programs in progress. B61-3 and -4 bombs are lightweight tactical bombs with [deleted] multiple-delivery and fuzing options. [Deleted.]

The W80-0 warhead for the Sea-Launched Cruise Missile (SLCM) is the same warhead (with only minor differences) as the W80-1 ALCM warhead, thus avoiding a costly and time-consuming separate development effort. Quantity production is scheduled to begin in March 1984, and the IOC date is June. The SLCM will be capable of launch from both submarine and surface vessels and is for use against land targets. [Deleted.]

The W84 warhead is used in the GLCM. It incorporates enhanced safety and security features such as insensitive high-explosive, [deleted] a mechanical safing and arming device, [deleted] and a command disable system to prevent unauthorized use. [Deleted.]

The W85 is the warhead for the Pershing II (PII) missile which is presently being deployed with United States forces in Germany as a replacement for the Pershing IA (PIA) missile. [Deleted.] It incorporates insensitive high-explosive and enhanced electrical safety features, enhanced security features [deleted].

BATTLEFIELD NUCLEAR SYSTEMS

The only battlefield nuclear system presently in production is the W79 warhead for the 8-Inch Artillery-Fired Atomic Projectile (AFAP). This AFAP, which has an enhanced radiation capability, entered production in 1981. It presently is being stored on United States soil pending receipt of authority from the President to deploy it to NATO. The W79 is intended to replace the W33 8-Inch AFAP (first entered the stockpile in 1951) [deleted]. I wish to bring to your attention the fact that we have not requested any funds for the W82 155mm AFAP. Enactment of the fiscal year 1984 DOD Authorization Act in September 1983 and the accompanying House and Senate Report directed the DOD to terminate the W82 program. Enactment of the fiscal year 1984 Supplemental Appropriations Act in November 1983 rescinded the $50 million previously appropriated to the DOE for construction of 155mm AFAP production facilities, and cited the action as being consistent with the action taken in the fiscal year 1984 DOD Authorization Act to terminate the program. We have informed the DOD that we are instituting an orderly phase-down of the program which will result in its termination by the end of fiscal year 1984. We stand ready to restore the W82 program if and when directed.

FLEET DEFENSE

The W81 is the warhead for the Navy's Standard Missile-2 which is employed on a variety of guided missile cruisers and destroyers. The weapon system is primarily intended for defense against high-altitude, supersonic, nuclear cruise missiles. [Deleted.]

The DOE is presently conducting a design definition and cost study (Phase 2A) for a new nuclear depth bomb for the submarine-launched, antisubmarine warfare/standoff weapon (ASW/SOW) system. [Deleted] there will be only a short development period. Although the warhead for the ASW/SOW is not expected to enter development engineering (Phase 3) until late 1985 or early 1986, the early selection of a warhead design will enable the DOE to develop the nuclear depth bomb and field a realistic payload for the flight tests.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FY 1985 CONGRESSIONAL SUBMISSION
(B/A $ IN MILLIONS)

	FY 1983 ACTUAL	FY 1984 ESTIMATE	FY 1985 ESTIMATE AUTH.	FY 1985 ESTIMATE APPROP.
RESEARCH AND DEVELOPMENT	738.5	844.3	1,085.2	1,085.2
TESTING	446.9	565.0	638.0	638.0
INERTIAL CONFINEMENT FUSION	189.8	169.7	138.0	138.0
PRODUCTION AND SURVEILLANCE	1,916.8	2,136.7	2,604.6	2,621.7
PROGRAM DIRECTION	54.4	57.5	60.2	60.2
TOTAL WEAPONS ACTIVITIES	$3,346.4	$3,773.2	$4,526.0	$4,543.1

	FY 1984 SUPPLEMENTAL
• STATE SALES/USE TAX LIABILITIES	$37.6
• SAFEGUARDS AND SECURITY, VL	20.4
• ENVIRONMENT, HEALTH, AND SAFETY, Y-12	7.6
TOTAL WEAPONS ACTIVITIES	$65.6

The weapons activities budget request of approximately $4.5 billion shown in this chart supports three major areas—weapons research, development, and testing; inertial confinement fusion; and production and maintenance of nuclear weapons. Allocation of these funds in fiscal year 1985 may, however, be dependent upon approval of the fiscal year 1984 supplemental budget request of $6.6 million. Of this amount, $37.6 million is for payment of taxes imposed on the government-owned, contractor-operated nuclear weapon facilities located in the States of Colorado, Missouri, Nevada, New Mexico, and Ohio. The legal standing of these liabilities was decided by last year's Supreme Court ruling which upheld New Mexico's claim that it had the right to impose a gross receipts tax on DOE contractors. The remaining $28 million in the fiscal year 1984 supplemental request is for various safeguards and security, and environmental, health, and safety projects.

Without the requested supplemental funding for payment of these taxes in fiscal year 1984, the Weapons Program will be compelled to absorb this unbudgeted expense by reducing program activities. This expense is beyond the control of the Department and must be paid in the normal course of business beginning with fiscal year 1984. Accordingly, without supplemental funding, the Department will be required to defer procurements, employment, and other key activities that support the research, development, testing, and production of nuclear weapons. In addition, in order to support DOE schedules to the DOD for those essential nuclear weapons, maintenance activities, procurements, and delivery schedules for selected nuclear weapons were delayed in order to live within the fiscal year 1984 appropriation for weapons production and surveillance activities. Funding is included in the fiscal year 1985 budget request to preclude future disruption of operations throughout the production complex.

PRODUCTION AND SURVEILLANCE

This chart [deleted] shows the deliveries to the DOD of nuclear weapons projected in the latest Nuclear Weapons Stockpile Memorandum (NWSM) approved by the President. It shows the increase in production rates and number of warhead systems, but it does not show the increased sophistication and complexity of these systems entering production. The task of producing many different warheads at the same time tends to push the weapons production complex to the limit in order to deliver a quality product on schedule.

The major portion of this budget request—over $2.6 billion—is to produce nuclear warheads, maintain them, certify their reliability, and disassemble and properly dispose of them. The guidance for when we perform these activities is contained in the NWSM.

The fiscal year 1985 budget request provides for operation and maintenance of the seven plants which manufacture components and assemble nuclear weapons. This includes production of new war reserve weapons, lifetime surveillance and maintenance of the weapons stockpile, process development to prepare for new designs and improved technology, retirement and disposal of warheads, and a stockpile improvement program to modernize certain older weapons currently in the nuclear stockpile.

Last year three new warheads were introduced on schedule: the B83 bomb, the W84 warhead for the GLCM, and the W85 warhead for the Pershing II Missile. This was a major achievement that taxed the resources of our production complex to their fullest. These new starts bring the total number of systems in production to nine (not including the B28 Stockpile Improvement Program (SIP) and the W68 warhead retrofit). With this large number of different systems in production, it would be impossible for us to meet the current or projected production schedule without continuing increases in productivity. These are being achieved by improving manufacturing techniques, the use of new materials, and more efficient scheduling.

CAD/CAM equipment and techniques will be employed extensively in the production of the W81 warhead and the W87 Peacekeeper. In addition, we initiated a cost saving related to submarine missile warhead planning.

[Deleted.] An example of the reduction of costs through materials is the substitution of [deleted] in the W80 with acceptable system impact [deleted]. This also results in increased productivity [deleted].

Another important activity initiated in fiscal year 1983 was a study of the capability and capacity of the nuclear weapons production complex. We wanted to assure ourselves that the production complex has sufficient reserve capacity to accommodate sudden increases in workload and to recover from disruptions or shutdowns of key facilities.

We are presently evaluating economically feasible actions to provide a modest measure of backup production capability in order to preclude cessation of deliveries in the event of a natural or manmade disaster at one facility or in one process.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FY 1985 WEAPONS PRODUCTION AND SURVEILLANCE CONSTRUCTION (Budget Authority in Millions)

	FY 1984	FY 1985
NUCLEAR WEAPONS PRODUCTION FACILITIES	$ 53.3	$121.1
UTILITIES & EQUIPMENT RESTORATION	185.0	175.1
GENERAL PLANT PROJECTS	23.0	32.2
SAFEGUARDS & SECURITY UPGRADING	18.5	29.7
ENVIRONMENT, SAFETY, & HEALTH IMPROVEMENTS	8.6	43.2
SUPPORT FACILITIES	55.8	138.1
TOTAL PRODUCTION & SURVEILLANCE CONSTRUCTION FUNDING	$344.2	$539.4

Of the $2.6 billion requested for production and surveillance, almost $540 million is for construction. New construction projects include tactical bomb production facilities at various locations, safeguards and site security upgrades, environmental improvements, and three production support projects. The remaining construction funds are required to continue projects authorized in prior years and the restoration program, about which I will talk more later.

RESEARCH, DEVELOPMENT, AND TESTING

The foundation of our nuclear weapons research, development, and testing (RD&T) program consists of the people and facilities at our three weapons laboratories—Los Alamos, Lawrence Livermore, and Sandia National Laboratories. As their names imply, these institutions are truly national assets. While their primary mission is nuclear weapons oriented, the laboratories' broad technical expertise is being applied to a wide variety of other national security problems as well. For example, under the sponsorship of the DOD, the weapons laboratories are becoming increasingly involved in nonnuclear work including cooperative research and development programs on nonnuclear military technology with the Army and with the Office of the Secretary of Defense. Weapons RD&T funding maintains in the laboratories and at the NTS the capability to meet future requirements for the strategic arsenal and ensure our ability to make weapons if required. A strong, healthy RD&T program is essential to ensure that our nuclear stockpile does not become obsolete. At the same time, continued emphasis on RD&T guards against technological breakthroughs by our adversaries that could seriously degrade the stockpile's deterrent value. Let me provide you a few examples of the weapons laboratories' capabilities:

Nuclear weapons technology remains the primary mission of these laboratories and supports our deterrent forces. [Deleted.]

High-energy beam technology, including sources, storage technology, switching, beam formation and control, and propagation has been, for many years, an area of emphasis in the weapons laboratories.

Materials sciences, surface science, and fabrication technologies which are pushed to new frontiers by the specialized demands of nuclear weapon design.

High explosive technologies, essential to the development of compact and safe nuclear explosives; the DOE weapons laboratories have established world preeminence in this area.

Very large-scale computer modeling was pioneered in the United States nuclear weapons program; the weapons laboratories have capabilities in this field that are unparalleled in the world.

The lead in high-speed scientific computers, which the United States enjoys, is in large part driven by the need for a more powerful computational capability to improve nuclear weapon design. Large, scientific computers are essential for the design of modern nuclear weapons and present computers at the laboratories are being used to capacity. The growth in computing demand is due in large part to new weapon concepts with potential defensive applications, and we expect that this demand will continue over the next few years. We need to continue to obtain the best and most capable computers for use in the nuclear weapons research and development laboratories.

Because of this lead in scientific computers, one of our national laboratories recently accomplished a successful transfer of technology to private industry. Under the S-1 computer project funded by the Navy and the DOE, LLNL developed and used automated computer design software called Structured Computer-Aided Logic Design (SCALD) in the program to design the advanced super-computer system, now under construction. This software has been made available to interested commercial, academic, and government users. In fact, several companies have sprung up specifically to market SCALD and assist in its implementation by users, and it appears that this laboratory effort is bringing about a significant change in computer design methods.

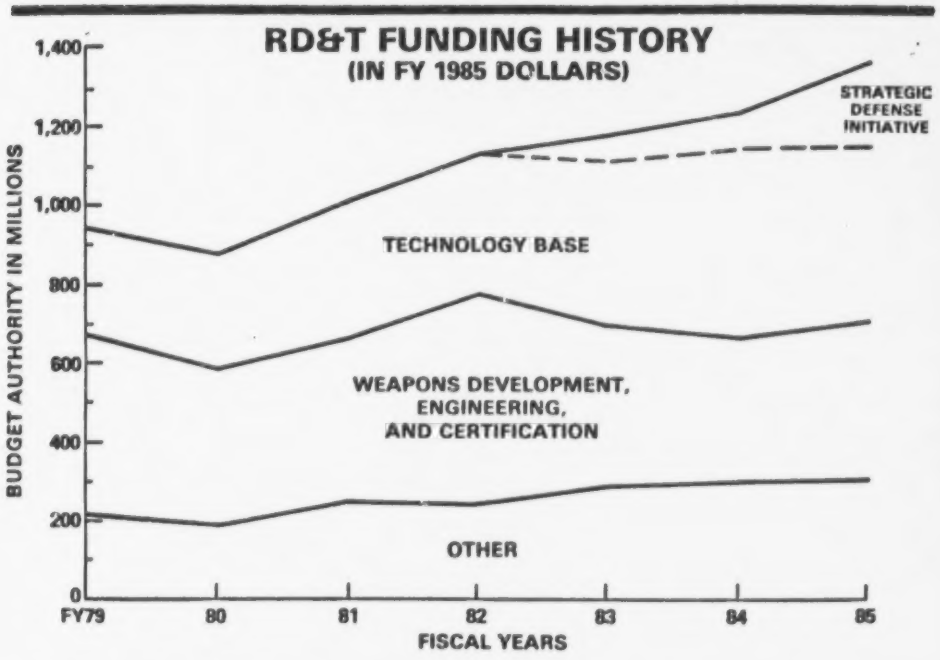
Underground nuclear testing is an integral part of the overall research and development process. Nuclear tests serve not only to confirm the soundness of weapon designs but also to perform important scientific experiments. These experiments enhance our understanding of the behavior of matter and energy at extreme temperatures and pressures and enable us to investigate new weapon concepts.

As we move toward the 1990s the design and, hence, the testing of nuclear weapons become more complex, with each design and test requiring more laboratory resources than ever before.

In particular, the underground tests are more complex because of the need for increased data from each experiment. This need is a result of the more complex physics involved in design of advanced devices as well as the fact that more sophisticated modeling capability demands increased physics understanding.

With the support of the Congress, we have turned around the decline that occurred in the 1970s in our weapons laboratories' resources to fulfill their primary mission—the design and testing of nuclear weapons. As shown on this chart, we have also increased the emphasis on the all important technology base during the last several years. [Deleted.]

DOE WEAPONS PROGRAM
NEW CONCEPTS AND PROGRAM BALANCE



For RD&T operating funds, the fiscal year 1985 request is about $151 million higher than in fiscal year 1984. This differential is made up of about $65 million to cover a 5 percent estimated cost escalation and about $86 million for real growth in the RD&T program. Most of this real growth will be devoted to technology base research in response to the President's Strategic Defense Initiative.

STRATEGIC DEFENSE INITIATIVE

The President proposed a different approach to national security last March when he directed a study of defensive technologies as a means to enhance security and stability by eliminating the threat of ballistic missiles. The resultant technology and policy study recommended a broad-based but focused R&D program that would permit future decisions regarding deployment of a defensive system.

The objective of the Strategic Defense Initiative program is to develop and demonstrate key technologies associated with concepts for defense against ballistic missiles. The objective of the DOE portion of the Strategic Defense Initiative program is to establish the technical feasibility of certain nuclear technology and to determine its applicability to development of a strategic defense system. We regard this effort as extremely important to national security and are working closely with the DOD, which is the lead agency for this initiative.

[Deleted.] This research is a broad-based effort which is an integral part of our nuclear weapons technology base activity. The relevant technologies have been funded previously within our RD&T activity, and we believe that this fiscal year 1985 budget request is an appropriate level of effort. However, additional growth in employment [deleted] may be required in the future to place proper emphasis on these concepts and maintain support for traditional RD&T activities. In addition, work continues within the technology base on more traditional nuclear weapon technologies that could have application to a strategic defensive system.

[Deleted.] The potential application of our nuclear, directed-energy weapon concepts to an eventual strategic defense system is sufficient reason for pursuing this research; however, there is an additional reason as well. In recent years, we have seen that the Soviets are well aware of the specific lines of approach to defensive strategic technologies that our scientists have also identified. We dare not neglect these areas and risk technological surprise.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

INERTIAL CONFINEMENT FUSION
(Budget Authority in Millions)

	FY 1983	FY 1984	FY 1985
OPERATING EXPENSES	$140.0	$145.0	$125.0
CAPITAL EQUIPMENT	11.0	11.8	9.5
CONSTRUCTION	38.8	12.9	3.5
TOTAL	$189.8	$169.7	$138.0

[Deleted.] Laser and particle beam inertial fusion drivers permit repetitive laboratory experiments and a high rate of data acquisition in some areas of weapons physics. [Deleted.] As new facilities come on-line we will be able to approach close to this goal in beam-driven experiments.

For fiscal year 1985 we are requesting for inertial fusion research and development a total of $138 million, of which $3.5 million is construction funding to complete the Particle Beam Fusion Accelerator II (PBFA II) at Sandia. This is in accordance with our program plan—to complete and operate the three large facilities before making major future commitments in this program. Most of our request—$125 million—is for operating funds for the three driver approaches—gas lasers, glass lasers, and pulse power machines—[deleted]. I would like to bring you up to date quickly on these efforts.

At Los Alamos we have just brought into operation the ANTARES carbon dioxide laser system. ANTARES will be used to evaluate several fusion target concepts applicable to long wavelength laser drivers as well as to develop an improved understanding of other laser-plasma interactions pertaining generically to inertial fusion implosions. The evaluation of the utility of carbon dioxide lasers for inertial fusion applications in the Antares facility will be completed in fiscal year 1985. We are requesting $30 million for gas laser experiments—that is, experiments using ANTARES. [Deleted.]

By the end of 1984, the NOVA laser facility at Livermore will be in operation, at about twice the energy of ANTARES and at a much shorter wavelength. NOVA experimental results, [deleted] are expected to provide verification of predicted scaling of inertial fusion target physics to ignition and burn. During the past year, two beams of NOVA assembled in the former ARGUS laser facility have provided verification of favorable scaling of target implosion phenomena to high energies and supported directed-energy weapon research through experiments to measure X-ray laser kinetics.

The short wavelength laser target experiments effort is supported by work at KMS Fusion, the University of Rochester, and the Naval Research Laboratory. We regard these support laboratories as an important element in the national inertial fusion program. Each has unique qualities and provides opportunities for investigating alternative technical approaches that would not otherwise be readily available. The present program plan provides for continued participation of the support laboratories at approximately the fiscal year 1984 level of effort. We are requesting $74 million in fiscal year 1985 for glass laser experiments on NOVA, [deleted] and supporting research based on glass lasers.

The third element in this program is the pulse power work at Sandia, in which we are building the PBFA II that is scheduled to be completed in 1986. Current ex-

periments on PBFA I, the predecessor facility, are expected to demonstrate production and propagation of beams of lithium ions for eventual target experiments on PBFA II. We are requesting $19.8 million in fiscal year 1985 for pulse power.

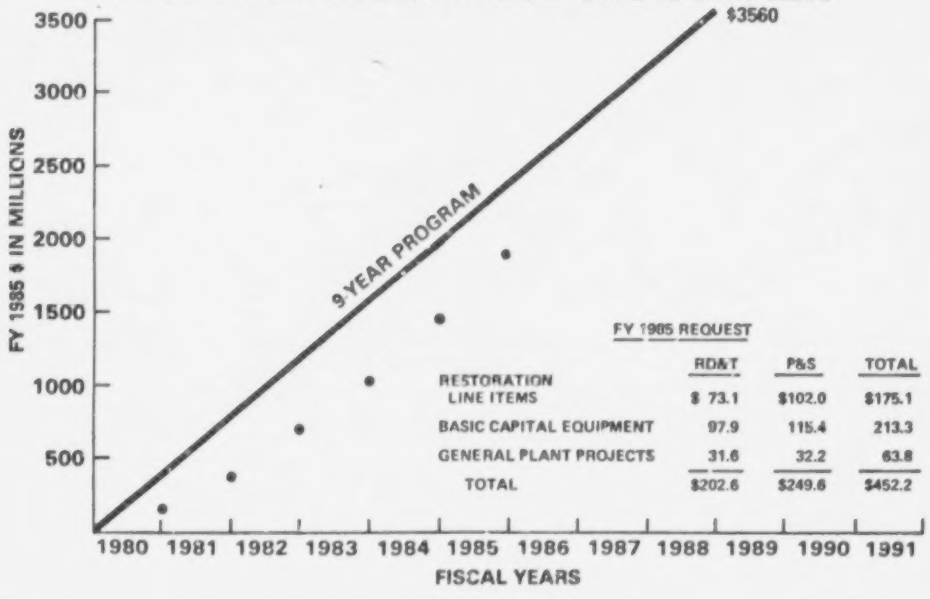
The program plan for inertial fusion is to complete the construction of the major facilities (NOVA, ANTARES, and PBFA II) and carry out target experiments as a basis for making an inertial fusion program decision in 1987. The fiscal year 1985 budget would complete construction funding of the third facility, PBFA II. We are also requesting the minimum funds we need for experiments using each of these driver approaches in support of planned technical evaluations by 1987.

There are certain crosscutting functions, about which I would like to speak, which are basic to the nuclear weapons complex. These are restoration and revitalization, environmental protection, and safeguards and security.

RESTORATION AND REVITALIZATION

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FUNDING REQUIREMENTS TO RESTORE & MAINTAIN NUCLEAR WEAPONS COMPLEX



FY 1985 REQUEST

	RD&T	P&S	TOTAL
RESTORATION LINE ITEMS	$ 73.1	$102.0	$175.1
BASIC CAPITAL EQUIPMENT	97.9	115.4	213.3
GENERAL PLANT PROJECTS	31.6	32.2	63.8
TOTAL	$202.6	$249.6	$452.2

There are two areas vital to a modernized nuclear weapons complex—one is the restoration program and the other is the revitalization program.

The restoration program was established to redress the impact of underfunding for general plant projects and capital equipment during the decade of the 1970s. The program was initiated in fiscal year 1980 as a five-year funding effort to bring the nuclear weapons complex capital asset base up to modern standards. This chart shows the progress thus far in the restoration effort. Although originally conceived as a five-year program, it has been stretched to nine years with a projected cost of $3.5 billion. The solid line shows the nine-year plan on which the fiscal year 1985 budget request is based. The dots display the cumulative funding through fiscal year 1985 including the $175.1 million for the restoration project included in this budget request. With your support real progress is being made, despite the delay in funding.

If the completion of the restoration program is not to be further delayed, funds requested in the fiscal year 1985 budget must be provided. The current restoration project now has a TEC of $1,178.1 million in fiscal year 1985 dollars. To date, $616.4 million has been appropriated through fiscal year 1984 for the restoration project. To slow the ongoing deterioration, the fiscal year 1985 budget also includes $31.6 million for RD&T General Plant Projects, $32.2 million for production an surveil-

lance (P&S) General Plant Projects, $97.9 million for RD&T basic capital equipment, and $115.4 million for P&S basic capital equipment. The basic capital equipment for RD&T and P&S does not include funding for computers.

REVITALIZATION
(DOLLARS IN MILLIONS)

- **INITIATION OF RD&T REVITALIZATION PROGRAM IN FY 1985**
- **RESEARCH, DEVELOPMENT, AND TESTING COMPLEX**

		FY 1985	
	TEC	AUTHOR.	APPROP.
— 85-D-102 NUCLEAR WEAPONS RESEARCH, DEVELOPMENT, AND TESTING FACILITIES REVITALIZATION, PHASE I, VL	$143.9	$56.6	$56.6
— 84-D-107 NUCLEAR TESTING FACILITIES REVITALIZATION, VL	75.2	34.9	34.9

- **FY 1985 FUNDING SUPPORTS THE MOST URGENTLY NEEDED REQUIREMENTS OF THE RD&T COMPLEX**
- **CONSOLIDATION OF THE NUCLEAR WEAPONS RD&T REVITALIZATION NEEDS INTO ONE PROJECT FOCUSES THE ISSUE OF THE TOTAL NEEDS OF THE RD&T PROGRAM**

I would now like to turn our focus to the RD&T facility revitalization. The nuclear weapons RD&T program is made up of a complex set of activities dependent on advanced technology facilities and equipment to support the accomplishment of our mission. In turn, the successful performance of the RD&T program contributes directly to the quality and reliability of the nuclear weapons stockpile. New weapon systems require, in addition to the most stringent requirements for reliability and performance, new safety and safeguards features and functional life ranging up to 25 years. Without providing the facilities and equipment necessary for this RD&T effort, the United States risks losing its superiority in nuclear weapons technologies and delaying development of the strategic defense initiative.

Recognizing the need and cost effectiveness for technologically advanced facilities, we initiated a facilities revitalization program which would provide a major infusion of construction funds over the next several years to assure the adequacy of the capital asset base to support the overall objectives of the weapons RD&T program. This initiative is aimed at achieving a long-term, balanced test program, and sustaining a healthy R&D program to support existing weapon systems, developing future weapons, and exploring new concepts and defensive technologies.

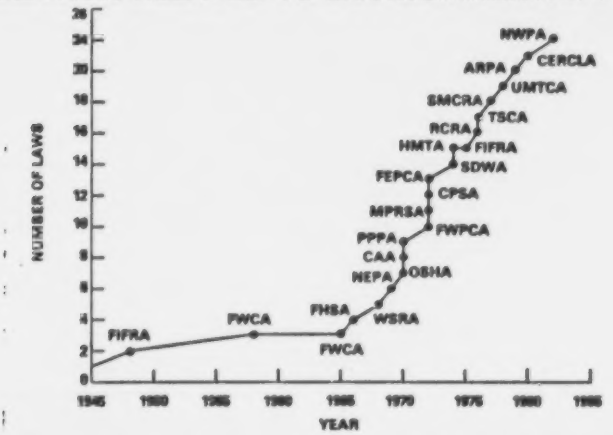
The funding request of $91.5 million for fiscal year represents the second increment of a multiyear program which will be used to fund the most urgent requirements of the three weapons laboratories and NTS.

ENVIRONMENTAL PROTECTION, SAFEGUARDS, AND SECURITY

The nuclear weapons complex is faced with some problems in the area of environmental protection, which have received both local and national attention. I would like to describe the environmental problems, particularly at Oak Ridge, and tell you what we are presently doing and proposing to do to remedy these.

DOE's Oak Ridge complex consists of facilities primarily at three sites on the DOE reservation. The Y-12 Plant's primary mission is production of nuclear weapons components. Activities at the Y-12 Plant were initiated in the 1940s under wartime priorities aimed at developing an atomic weapon. These activities continued into the 1950s, during which there was a lack of detailed knowledge of the environmental impact of many of the materials used. Similarly, there was no significant national focus at that time on environmental protection and, therefore, minimal regulations or guidance at the state and national level.

LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA – FEDERAL INSECTICIDES, FUNGICIDE, AND RODENTICIDE (1948, 1972, 1975)
FWCA – FISH AND WILDLIFE COORDINATION (1958, 1965)
FHSA – FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA – WILD AND SCENIC RIVERS ACT (1968)
NEPA – NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA – POISONIOUS PACKAGING PREVENTION (1970)
OSHA – OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA – CLEAN AIR (1970, 1977)
FWPCA – FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972, 1977)
MPRSA – MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA – CONSUMER PRODUCT SAFETY (1972)
FEPCA – FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA – SAFE DRINKING WATER (1974, 1977)
HMTA – HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA – RESOURCE CONSERVATION AND RECOVERY (1976, 1979)
TSCA – TOXIC SUBSTANCE CONTROL (1976)
SMCRA – SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA – URANIUM MILL TAILINGS CONTROL (1978)
ARPA – ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA – COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA – NUCLEAR WASTE POLICY ACT (1982)

As shown in the chart, there was little environmental legislation until the mid-1960s, and many of the environmental problems which we are encountering today stem from our activities prior to this. During the 1960s, with improving technical knowledge, important progress was made in upgrading operations at Oak Ridge, particularly with respect to radioactive waste burial practices. While this improvement continued into the 1970s, its pace did not match the development of a national commitment to the environment, the establishment of governmental oversight bodies, and the rapid development of more restrictive laws and regulations.

Environmental characterization and upgrading have been in progress at the DOE Oak Ridge reservation for years. However, recent inspections by the Environmental Protection Agency and the state have emphasized the need to accelerate environmental compliance activities on a more comprehensive basis.

Y-12 PLANT ENVIRONMENTAL IMPROVEMENTS
(B/A IN MILLIONS)

	CONSTRUCTION COSTS	
	FY 1984	FY 1985
PROJECT 81-D-120, CONTROL OF EFFLUENTS AND POLLUTANTS (TEC-$7.8)	$1.0	$ 1.4
*PROJECT 84-D-124, ENVIRONMENTAL IMPROVEMENTS (TEC-$56.0)	7.6	21.4
PROJECT 85-D-121, AIR AND WATER POLLUTION CONTROL FACILITIES (TEC-$29.0)	—	5.0
	$8.6	$27.8

*FY 1984 SUPPLEMENTAL BUDGET REPORT

Numerous initiatives have been made over the past two years to bring the present Y-12 Plant operations into compliance with the various environmental regulations and to meet our obligations to the binding legal agreements with the state. Fiscal year 1984 construction costs for environmental improvements at the Y-12 Plant total $8.6 million. This includes $7.6 million in fiscal year 1984 supplemental funding. Requirements for fiscal year 1985 construction total $27.8 million.

More difficult to solve than the environmental problems associated with present production at the Y-2 Plant are those resulting from past waste management practices. These are more difficult to define, requiring extensive record research, field testing and monitoring, and development of new technologies before any long-term remedial actions can be undertaken.

As a result of our environmental experience at the Y-12 Plant and other facilities, Defense Programs is taking steps to assess the environmental posture of all of our facilities and determine what corrective actions are needed. Over the past year, we have initiated several actions to deal with this issue:

1. Specific guidance has been developed to address environmental legislation and regulations.
2. A long-range environment, safety and health (ES&H) program plan is being prepared.
3. An ES&H Resource Group, made up of experienced professionals from the field offices and contractors of the weapons complex, has been formed to provide management with technical guidance and recommendations on environmental issues.

In this important environmental area, I wish to emphasize our commitment to operating our facilities within the established environmental regulations and to minimize any actual or potential risk to public health from those operations.

I would now like to discuss another area of major concern within the weapons complex—that of safeguards and security. With an increase in activities by international terrorists and antinuclear extremists, we became concerned as to whether the nuclear weapons complex was adequately protected. As a result, two years ago we established a working group to evaluate our safeguards and security posture and develop a long-range plan for safeguards and security throughout the weapons complex.

Several improvements in equipment and facilities have already been instituted. Examples include installation of new intrusion detection systems, armed guard towers, additional fences with reinforced concrete barriers, and improve control and command centers. Our security forces are being equipped with new weapons to increase their fire power, additional armored response vehicles, and helicopters to provide emergency response capability.

Even with the new equipment and security additions, the effectiveness of our safeguards and security program is still a function of how well our security forces perform. Additional response training exercises have been instituted at our facilities to include coordination with local law enforcement agencies. At many of our sites we have developed special response teams, trained to effectively deal with violently ag-

gressive forces. We have also implemented a program that dictates the required physical fitness of our security forces.

The fiscal year 1984 supplemental budget request includes $20.4 million for five major safeguards and security projects, and the fiscal year 1985 budget contains a request for $80.5 million to continue eight prior-year projects and to initiate eight new starts. We will continue to look at all site-by-site vulnerabilities [deleted]. We are dedicated to taking whatever actions are necessary to assure the security of our weapons production inventories, our facilities, and the nuclear warheads in our custody.

SUMMARY

FY 1985 WEAPONS PROGRAM BUDGET SUMMARY

- **THE BUDGET:**
  - **MEETS ALL NWSM REQUIREMENTS**
  - **SUPPORTS GROWTH IN STRATEGIC DEFENSE INITIATIVE**
  - **CONTINUES RESTORATION PROGRAM**
  - **CONTINUES FY 1984 TEST REVITALIZATION PROGRAM AND INITIATES RD&T PROGRAM**
  - **SUPPORTS LONG-TERM COMMITMENT TO ENVIRONMENT, SAFEGUARDS, AND SECURITY**
  - **SUPPORTS VIABLE ICF PROGRAM**
  - **CONTINUES STOCKPILE IMPROVEMENT PROGRAM**

In summary, our production capability and capacity, although stressed, have kept pace with scheduled warhead deliveries. However, when we produce 8-to-10 different state-of-the-art systems, with all the risks inherent in a success-oriented program, a problem in one weapons system tends to impact other systems. We need the flexibility to solve unanticipated problems without interfering with scheduled production and, at the same time, accommodate new concepts. Somehow this flexibility must be factored into the weapons development process if we are to remain in the forefront on nuclear weapons and new concepts development into the 21st century. We will be able to meet our near-term workload, but the outyears will be more difficult.

For these reasons, we believe it is imperative that the fiscal year 1984 budget supplemental for weapons activities be approved. The fiscal year 1984 supplemental budget request of $65.6 million is comprised of $37.6 million for operating expenses and $28 million for construction activities. The operating funds are for weapons activities and to pay various forms of gross receipts and sales/use taxes imposed by the States of Colorado, Missouri, Nevada, New Mexico, and Ohio. Included in the construction funding is $7.6 million to initiate environmental improvements at the Y-12 Plant in Oak Ridge, Tennessee; and $20.4 million for safeguards and security upgrading at LANL, SNL (Albuquerque), NTS, Y-12, and the Pinellas Plant. The fiscal year 1985 budget request coupled with the requested fiscal year 1984 supplemental, will serve to meet the anticipated needs of the nuclear weapons complex.

Production capacity has kept pace with the NWSM requirements due, in part, to the restoration program and to increased productivity.

I believe that the measured growth projected in the Strategic Defensive Initiative serves to complement our ongoing research, development, and testing program.

We have encountered serious environmental problems which we are committed to overcome. Some of these problems could not have been foreseen, but some could have been alleviated had we had a certain amount of management flexibility. We need to work together to develop a mechanism which will provide the ability to

move quickly to solve a problem without a concomitant impact on delivery schedules.

We are proud of the nuclear weapons complex and, especially, its major resource, its people, with its ability to meet production requirements year after year and yet be in a position to meet new challenges. We must continue to plan and fund for the long term to maintain this unique resource. Mr. Chairman, this concludes my statement.

PREPARED STATEMENT OF JAMES W. CULPEPPER, DEPUTY ASSISTANT SECRETARY FOR SECURITY AFFAIRS, DEPARTMENT OF ENERGY

Mr. Chairman and members of the committee, it is indeed a pleasure to appear before you today to address the Department of Energy's Security Affairs programs of Nuclear Safeguards and Security (including Classification), Security Investigations, and Verification and Control Technology and the fiscal year 1985 request and the fiscal year 1984 supplemental request required to carry out these important activities.

The programs I will discuss with you today play a critical role in fulfilling the national security mission of the Department. They contribute significantly to preventing the theft or sabotage of nuclear weapons, materials, facilities, and classified information; developing and implementing policy for the classification and declassification of information; providing nuclear weapons systems expertise to the Intelligence Community; controlling proposed exports of nuclear materials and equipment; and providing the technology and equipment necessary to monitor treaty compliance of foreign nuclear weapons programs.

SECURITY AFFAIRS

As Mr. Morgan stated in his opening remarks, as the Deputy Assistant Secretary for Security Affairs, I am responsible to him for the direction and management oversight of the Security Affairs activities of the Department.

Here with me today are: Mr. Ralph Caudle, Director, Office of Safeguards and Security; Dr. Julio Torres, Director, Office of International Security Affairs; and Mr. Robert Duff, Director, Office of Classification. All three individuals would be pleased to answer any questions you or the members of the Committee might have. Also here with us today is Mr. Charles Boykin, who was recently appointed the Deputy Assistant Secretary for Intelligence.

[Deleted] accordingly, I will cover intelligence matters in my presentation today. Mr. Boykin will be happy to answer any questions you may have regarding our intelligence activities.

With the Chairman's permission, I will submit my formal statement for the record. I would then like to make a presentation which covers the Department's safeguards and security activities, highlights some of Security Affairs program activities, and discusses the funding requested in the President's fiscal year 1985 budget and the fiscal year 1984 supplemental request. You each have copies of my formal statement and the viewgraphs I will use today.

FISCAL YEAR 1985 BUDGET

The overall funding requirement in fiscal year 1985 for Security Affairs' programs is $173.4 million. This consists of $62.7 million for Nuclear Safeguards and Security (including $3.9 million for Classification), $34.0 million for Security Investigations, and $76.7 million for Verification and Control Technology. I will now briefly discuss each of the Security Affairs programs.

NUCLEAR SAFEGUARDS AND SECURITY

The Nuclear Safeguards and Security program has three major program goals. These are:

To prevent the unauthorized disclosure, theft, sabotage, or loss of nuclear materials, facilities, and classified information;

To provide a base of safeguards and security technology and information which can be used to protect Department of Energy facilities, and control and account for nuclear weapons, materials, and classified information; and

To strengthen international safeguards and physical security to deter the diversion of nuclear materials and support nonproliferation and national security.

Before discussing some of our accomplishments during the past year, it is appropriate to make a more general statement about our Nuclear Safeguards and Securi-

ty program. I think we are passing through a period of transition and progress based on a more systematic and direct approach to the safeguards and security programs of each Department of Energy field office. Today, in addition to meeting the requirements of all Department of Energy orders and directives, the effectiveness of each site's safeguards and security program is measured in terms of the total program's responsiveness to precluding the possibility of a successful malevolent act. We closely examine the overall effectiveness by onsite evaluations of the key elements of the program (physical protection, material control and accountability, technical security, and personnel security) to successfully address and counter the perceived threat to a given facility.

We now routinely conduct exercises [deleted] of the key security elements, including particularly complex reviews of guard force performance under simulated attack and fire as a major component of our current approach. This process is working extremely well and, as a result, both near-term and long-range system enhancements are being realized at an accelerated pace.

ACCOMPLISHMENTS

The accomplishments of the past year result from the major commitment of Secretary Hodel and the Department to quickly and effectively improve the safeguards and security posture at our most critical facilities. These include: significant initiatives to enhance the effectiveness of our protective forces; improved weapons and equipment capabilities; and facilitation of ratification procedures relating to onsite military assistance during a terrorist incident.

The Secretary has recently approved the concept of an enhanced Inspection and Evaluation program that will provide for more frequent and more comprehensive evaluations of the Department's field offices and key facilities.

Work is progressing on development of airspace restrictions over nine critical facilities. The formal rulemaking process began with a February 8, 1984, Federal Register notice, and a public hearing was held on March 13.

During the past year, we also have developed safeguards and security plans for all our major facilities. These plans are used as a baseline against which we measure our progress in meeting outstanding safeguards and security requirements.

The groundwork has been completed for the establishment of a Central Training Facility at Kirtland Air Force Base in New Mexico to meet the needs of both security inspectors and mid- and senior-level Departmental representatives, and we are moving through the approval process to establish that facility.

With the Office of Safeguards and Security's assistance the Department has established a policy requiring the Department's contractors and potential contractors to report any foreign ownership, control, or influence on their operations. An assessment of each firm's foreign relationships is now made to determine whether a risk to the national security exists. If a national security risk does exist, contracts can be terminated or contract bids denied.

Underscoring all of the above efforts is the concept of corporate commitment—on the part of both Department of Energy officials and officials of major contractor organizations—to the Department's safeguards and security mission. The importance of corporate commitment in accomplishing existing and future safeguards and security improvements cannot be overstated. We have reassured ourselfs of this commitment from our major nuclear facilities' contractors.

I would now like to move on and discuss the activities and budget request for the five elements of the Nuclear Safeguards and Security program. These include: safeguards and security operations, technology development, international safeguards, classification, and program direction.

SAFEGUARDS AND SECURITY OPERATIONS

Specific safeguards and security operations activities include: direct assistance to Departmental field operations for physical protection systems improvements; oversight and operation of the nuclear materials management and safeguards system, which provides timely data on nuclear materials production, utilization, tracking, and storage; and the operation of the New Brunswick Laboratory, which carries out safeguards analysis tasks at Argonne, Illinois. A major objective of the safeguards and security operations element is to assist Department of Energy operating contractors in designing and applying safeguards and security technology in order to ensure the implementation of cost-effective, site-specific, physical protection systems. At the heart of this program is the continued need to provide field elements with timely information on advanced hardware and technology to mitigate the threats to the Department's activities and resources. The Department's sites vary

from dated large nuclear materials production reactors, large uranium enrichment plants, and one-of-a-kind weapon production sites to new facilities, such as the Fuels and Materials Examination Facility. Also, some of our facilities are located on the Nevada Test Site, where onsite guard forces and protection systems [deleted].

In fiscal year 1985, major efforts will be expended to ensure that technology that has been developed in the Nuclear Safeguards and Security program will be applied to upgrade protective activities and to [deleted]. Based on comprehensive vulnerability analyses at selected Department of Energy sites, we will be implementing systems incorporating technological advances in access denial, intrusion detection and assessment, integrated security communications, entry control, and materials control and accounting. Personnel and materials control and assessment systems will be installed at production reactors and material processing facilities to counter potential sabotage and diversion threats by insiders.

Through good management and technology, we will improve our capabilities to neutralize attempts to interfere with the Department's communications or to penetrate information processing systems. Activities will include the assessment of field operations to determine the existence of vulnerabilities to hostile intelligence efforts, the development of advanced audio surveillance and suppression methods, and the continuation of developmental activities and training for improved security of classified computer operations.

As previously mentioned, we are in the process of strengthening our inspection and evaluation function. Staff increases are planned along with an accelerated schedule and more comprehensive inspections of safeguards and security operations at the Department's field activities. Continued emphasis on this program and our followup efforts are critical if we are to [deleted] maintain a properly balanced and successful safeguards and security program.

Technologically advanced special weapons and tactics training, with a particular focus on realistic combat situations, has become a critical ingredient in improving the capabilities of our protective forces at each of our facilities. To ensure the effectiveness of this training, in terms of consistency and uniformity, we are in the process of obtaining Departmental approval to begin operation of the safeguards and security Central Training Facility in Albuquerque, New Mexico. Enhanced guard force tactical training and testing techniques will be implemented and evaluated and be supplemented with a detailed curriculum on various aspects of physical security. The transfer of information on technological advancements for various safeguards and security disciplines will also be provided at the Central Training Facility.

We will continue to operate our Nuclear Materials Management and Safeguards System, the Nation's single nuclear materials computerized data base for recording the shipment of nuclear materials to and from foreign countries. Each year, approximately 78,000 nuclear material transactions (e.g., shipment, receipts, and inventory changes from 93 contractors and 1,400 licensees) are entered into this system.

We will also continue direct support to the New Brunswick Laboratory, which serves as the United States Government's safeguards analytical laboratory and provides materials and services to the Department of Energy, the Nuclear Regulatory Commission, and other Government agencies, as well as to commercial, industrial, and foreign organizations. The laboratory's measurement, reference material standards, and inventory verification services fulfill safeguards requirements essential for the control and accounting of nuclear materials.

TECHNOLOGY DEVELOPMENT

Technological development is an integral part of our safeguards and security program since advance technology is necessary for improved protection systems for our nuclear facilities. Research and development as conducted by the national laboratories provides us with a technological base to be used in safeguards in the Department's nuclear facilities and to assist the Nuclear Regulatory Commission and its licensees. Efforts are directed towards the development and testing of new technology components and systems for entry control, intrusion detection, explosives detection, use-denial, and detection-surveillance assessment for airborne intrusion to increase our effectiveness against threats.

The fiscal year 1985 activities include planned improvements for the control and accounting of nuclear material. These activities include projects to measure specific nuclear materials that are inherently difficult to measure, such as materials that are inside processing equipment which are, therefore, inaccessible for measurement by conventional methods. Also in fiscal year 1985, field demonstrations will be con-

ducted on measurement techniques that can be used nondestructively and remotely and, thus, contribute to safe operations and provide efficient mesurement for highly irradiated reprocessing dissolved solutions at the Idaho, Richland, and Savannah River facilities.

Our reseach and development activities are closely coordinated with ongoing development efforts of the Nuclear Regulatory Commission and the Department of Defense to ensure that advanced technology is routinely transferred among each entity to assist each agency's protection efforts. We routinely explore the feasibility of joint research efforts to reduce the cost of such activities to each agency and the United States Government.

INTERNATIONAL SAFEGUARDS

Our international safeguards program supports United States nonproliferation initiatives and is scoped to improve the effectiveness of the International Atomic Energy Agency. The program for fiscal year 1985 includes developing safeguards for application at the new Gas Centrifuge Enrichment Plant at Portsmouth, Ohio, which will be inspected by the International Atomic Energy Agency. Also, we will continue to develop procedures and instrumentation for safeguarding spent fuel reprocessing plants and to train foreign personnel to perform safeguards and security functions in their own countries in accordance with the provisions of the Nuclear Non-Proliferation Act of 1978. We will also be developing and testing alternative designs for a fiber optical security seal that can be verified while still attached to the object being protected, rather than having to be transmitted to Vienna, Austria, for verification.

Compliance with international agreements and nonproliferation objectives requires tracking international shipments of United States materials and shipments of foreign materials in the United States. Continuing activities will include recording exports, imports, and transfers of materials of foreign origin in the United States; reporting to the International Atomic Energy Agency under the United States/International Atomic Energy Agency Ageement; and determining inventories of nuclear materials for bilateral agreements.

CLASSIFICATION

The goals of our Classification program are to: provide Department-wide guidance on classification and declassification policies and procedures; to develop and update classification guides for the nuclear weapons program and other classified areas; to conduct classification and declassification reviews of documents; and to oversee classification activities in Headquarters, field offices, and contractor organizations.

The key to meeting these goals lies in keeping pace with technological advancements inside and outside the Department. To this end, the Office of Classification has sought, and will continue to seek, support in the development of its classification policies and guidance in the form of technical studies and analyses in such areas as nuclear weapons and safeguards and security. We are using such support in a major revision to the classification guidance covering the safeguards and security program.

During the past year, the Classification program completed a new, comprehensive policy guide for nuclear weapons and is continuing a major revision of its education and appraisal functions with a view towards expanding the scope and improving the effectiveness of these programs. Work is continuing on the development of an automated information retrieval system for all classification guides and other precedent-setting documents. This retrieval system will improve the Department's ability to develop new classification guidance and to provide for a more responsive document review program. Continued support of these and other key projects in fiscal year 1985 will ensure that the Department maintains a comprehensive and effective classification program.

PROGRAM DIRECTION

Our program direction request, which is the same as for FY 1984, supports a total of 146 full-time equivalent positions, which includes the staff for the Classification program.

SECURITY INVESTIGATIONS

The fiscal year 1985 authorization request for personnel security investigations is $34.0 million. As you know, Mr. Chairman, background investigations are required by the Atomic Energy Act of 1954, as amended, and by Executive Orders 10450 and

10865. Under these guidelines, the Department is not permitted to conduct background investigations on its own; hence, we have established a single program with procedures wherein the Federal Bureau of Investigation and the Office of Personnel Management conduct these investigations for us on a reimbursable basis. The investigations are conducted prior to the granting of access to Department of Energy classified information, and/or special nuclear materials.

The single program was established in order to have efficient program management and be consistent in meeting the strict security requirements of the Atomic Energy Act of 1954 to ensure that granting access to classified information, classified material, or special nuclear material will not endanger the common defense and security. Most background investigations directly support Defense Programs' activities; however, all Departmental security investigations are funded under Defense Programs since any clearance or access determination is directly related to protecting the common defense and security. We have improved the effectiveness and timeliness of our clearance program by changing procedures in access eligibility regulations revising security questionnaire forms to make them more inclusive, and requiring Department of Energy contractors to perform more stringent pre-employment checks.

The projected cost for a single Federal Bureau of Investigation background investigation is $1,850, which is the same as in fiscal year 1984. The projected cost for an Office of Personnel Management background investigation is $1,625, a decrease of about $125 per investigation from fiscal year 1984. National Agency Checks are expected to continue to cost approximately $10 each. Our budget request provides for approximately 20,630 full-field investigations and 10,500 National Agency Checks, which is a net increase over the current fiscal year of approximately 3,800 investigations.

SAFEGUARDS AND SECURITY CROSSCUT

To this point I have been discussing the funding request for Security Affairs' programs. The DOE outlay programs provide the funding for the actual construction, capital equipment, and operating expenses for safeguards and security activities relating to their programs at the Department's field facilities. Total safeguards and security funding is reflected in the Department's safeguards and security crosscut, which is an administrative summation of all safeguards and security items in the Department's program requests. The crosscut authorization request for fiscal year 1985 totals $565.8 million.

With respect to these Departmental activities, I have a broad range of responsibilities. A major one of these is the responsibility to carry out a systematic identification of vulnerabilities at out facilities and to ensure that required corrective actions receive prompt attention, emphasis, and support. This responsibility is carried out through normal interface with appropriate Headquarters and field office managers. Unresolved issues are referred through the Assistant Secretary for Defense Programs to the Office of the Secretary.

The Secretary plays a critical role in this process by assuring that activities included in the crosscut receive appropriate support from all levels of management within the Department. This increased emphasis is indicated by the fiscal year 1984 supplemental request of $64.3 million, which will provide accelerated funding for safeguards and security activities at the Department's facilities, and by a request for increased funds in the fiscal year 1985 crosscut. In particular, we are pursuing a vigorous construction program to upgrade outdated facilities; this is reflected in increased requirements for construction programs in fiscal year 1985 and outyears.

VERIFICATION AND CONTROL TECHNOLOGY

The Verification and Control Technology program has four specific goals:

To develop and produce the technology to monitor foreign nuclear explosions conducted underground, in the atmosphere, and in space and to monitor compliance with nuclear weapons-related treaties.

To control proposed exports of nuclear- and energy-related materials, equipment, and technology to ensure they are consistent with United States national security and with nonproliferation policy.

To provide technical and analytical support for the Department of Energy's role in nuclear arms control negotiations, policy formulation, and implementation.

To meet Department of Energy intelligence requirements and to provide the Department's unique weapons- and nuclear-related expertise to the Director of Central Intelligence and the Intelligence Community.

The Verification and Control Technology program has been managed by the Office of International Security Affairs which, until recently, consisted of three divisions: Science and Technology, Politico-Military Security Affairs, and Intelligence. As I mentioned earlier, we now have a Deputy Assistant Secretary for Intelligence within Defense Programs who will have responsibility for all DOE intelligence activities. Mr. Boykin, a veteran of many years with the Central Intelligence Agency, has also been designated as the Department's Senior Intelligence Officer.

The fiscal year 1985 authorization request for the Verification and Control Technology program is $76.7 million. In addition, there is a $6.2 million fiscal year 1984 supplemental request for this program.

The fiscal year 1985 increase of $8.8 million over fiscal year 1984 is attributable mainly to increased deliveries of nuclear explosion detection sensors which ride on various satellites and lesser increases for our base technology efforts, increased requirements for technical analysis of national security and foreign policy issues related to nuclear weapons systems, [deleted].

The fiscal year 1985 request also provides $1 million to begin construction of a Space Science Laboratory supporting satellite fabrication and technology development efforts at Los Alamos. Total estimated cost for this facility is $7.5 million, with completion in late 1987.

ACCOMPLISHMENTS

Prior to discussing specific program activities, I would like to briefly highlight several activities and accomplishments of this program.

Over the years, the Department of Energy has delivered state-of-the-art instrumentation for seven United States satellites. These instruments are comprised of sophisticated sensor systems capable of detecting nuclear explosions from the earth's atmosphere [deleted]. Data transmitted are analyzed and applied to United States responsibilities for the verification of foreign entities' nuclear activities in light of nuclear treaties and in support of United States nonproliferation efforts, [deleted]. Most of our proposed growth in fiscal year 1985 is associated with sensors for the space detection program.

Significant improvements have also been made in developing the ionospheric and infrasonic techniques for monitoring underground explosions and applying these strategies to accurately distinguish between nuclear events and earthquakes. The Coalinga, California, earthquake of May 2, 1983, was detected by both the ionospheric and infrasonic sensors, producing the first earthquake data the Department has acquired under these programs. Efforts are underway to compare and contrast signals detected during this event with past nuclear explosion data to further our overall knowledge and data base in this extremely important area.

Within the Verification and Control Technology program there are two main programmatic elements: detection technology and analytical support.

DETECTION TECHNOLOGY

This element of the program encompasses a wide range of technologies related to the detection of nuclear weapons activities, including spaceborne sensors, debris detection and sample analysis, seismic and nonseismic techniques, and other scientific efforts. The fiscal year 1985 budget request for detection technology is $50.8 million, a $5.4 million increase over the fiscal year 1984 level of $45.4 million.

SPACEBORNE SENSORS

The overall purpose of our space effort is to develop and maintain U.S. capability to detect, locate, [deleted] nuclear explosions from spaceborne platforms [deleted]. The effort includes research and development, the actual fabrication of sensor packages, and operational support, which provides for calibration and testing of subsystems and evaluation and analysis of data collection, processing and exploitation. In fiscal year 1985, the Department will deliver sensor packages for nine satellites, which amounts to more than a doubling of deliveries over fiscal year 1984.

The main carriers of Department of Energy-made sensors are the Global Positioning System [deleted]. All Department of Energy sensors ride the satellites on a secondary mission basis. The Global Positioning System's primary mission is to provide a highly accurate navigational capability for the military [deleted]. When the Global Positioning System is fully deployed in the late 1980's, the onboard sensor will be able to locate atmospheric nuclear explosions anywhere on earth with a very high degree of precision, [deleted].

[Deleted.]

[Deleted.] Base technology activities will include improving sensor longevity and reliability, increasing multi-function integrated circuit capability and substantially reducing size, weight, and power consumption.

DEBRIS DETECTION AND SAMPLE ANALYSIS

By the late 1980's we expect our enhanced satellite sensor capabilities to improve monitoring of the vast ocean areas of the Southern Hemisphere [deleted].

In the interim, the Department of Energy is working on design, fabrication, test, and evaluation of a free-floating, buoy-type marine platform and associated sensors with low-cost, real time satellite communication capability to provide partial coverage until full satellite coverage is established. Platforms have been deployed in the Gulf of Mexico and the Pacific Ocean in order to study background radiation, debris transport mechanisms, and radio nuclide deposit patterns. Once the techniques have been demonstrated, we expect that the Air Force Technical Applications Center will pursue final development, procurement and deployment of the marine platforms or of similar special, land-based sensors.

[Deleted.]

SEISMIC

The goal of the Department's seismic research program is to determine the effectiveness of regional—that is, short-range—seismic signals for monitoring compliance with nuclear test ban treaties. Such regional seismic monitoring would augment and be integrated with teleseismic—that is, long-range—monitoring systems, currently managed by the Air Force, as a verification tool. The Department's seismic research program is fully coordinated with the Department of Defense, particularly with the Air Force Technical Applications Center and the Defense Advanced Research Projects Agency.

We plan to maintain our seismic detection effort at the fiscal year 1984 level, with the Department continuing to operate its five station Regional Seismic Test Network deployed in the United States and Canada. The Regional Seismic Test Network is a research tool for learning how such an in-country system might be used to monitor compliance with nuclear test ban treaties. One objective is to develop technology that will differentiate ambiguous siesmic events, such as earthquakes, from nuclear explosions, in order to demonstrate the usefulness of regional seismic measurements for verification. In another effort, by arrangement with Norwegian authorities, the Department of Energy and the Defense Advanced Research Projects Agency this year will deploy and begin operating an experimental Regional Seismic Array System in Norway. Like the Regional Seismic Test Network, one of its objectives will be to reduce ambiguities caused by other seismics events such as earthquakes.

[Deleted]. In fiscal year 1985, the array will become fully operational. We expect it to collect data for two to three years. Analysis of this data will determine the value of the technology for verifying compliance with treaties limiting underground nuclear tests.

NONSEISMIC

This program has two main components: infrasonic monitoring, which uses microphone arrays to monitor extremely low frequency sound propagated in the upper atmosphere by underground nuclear explosions; and ionospheric monitoring, which uses over-the-horizon radar to monitor electron-density perturbations of the ionosphere. Both technologies could prove valuable verification techniques because they are long-range monitoring tools which do not have to be deployed within a country's border to determine compliance with nuclear test treaty commitments. Again, a main issue of our research and development effort is developing capabilities to distinguish between infrasonic or ionospheric signals generated by underground nuclear explosions and signals caused by earthquakes, thunderstorms, and such. During fiscal year 1985, the nonseismic detection program will continue without major change.

ONSITE MONITORING

[Deleted] we are examining ways to improve the verifiability of the Threshold Test Ban Treaty. In particular, this budget provides seed money for examining the usefulness of onsite hydrodynamic yield measurement techniques to improve the accuracy of seismic yield estimation.

If and when the Peaceful Nuclear Explosions Treaty is ratified, the United States must be prepared to exercise its onsite monitoring rights. The fiscal year 1985 funding request will enable the Department to maintain personnel and equipment in readiness for this activity. However, if the treaty is ratified, additional resources will be needed for the long term.

In fiscal year 1985, we intend to pursue enhanced monitoring technology efforts in anticipation that nuclear arms negotiations with the Soviets will be resumed and could lead to agreements requiring new verification measures.

VERIFICATION EXPERIMENTS

In fiscal year 1984, working with other U.S. Government agencies, the Department conducted experiments related to remote detection of underground nuclear explosions. The resulting data will be evaluated in fiscal year 1985 to improve our means for estimating nuclear yield in support of test ban monitoring and verification.

In fiscal year 1985, the Department will undertake experiments using data from our nuclear weapons tests to evaluate monitoring techniques and improve the verifiability of treaties. [Deleted.]

ANALYTICAL SUPPORT

Analytical support activities fulfill our responsibilities in weapons and proliferation [deleted] arms control, export control, technology transfer, and international scientific exchange.

The fiscal year 1985 budget request for analytical support activities is $19.7 million, a $1.8 million increase over the fiscal year 1984 level of $17.9 million.

WEAPONS [DELETED]

The Intelligence Community relies on the Department of Energy and the intelligence elements of the Department's nuclear weapons complex for expertise in the analysis of information regarding foreign nuclear weapons. [Deleted.]

[Deleted.]

PROLIFERATION [DELETED]

The basic objectives of the proliferation [deleted] program reflect the general United States determination to impede the spread of nuclear weapons. The proliferation [deleted] effort contributes directly to formulation and implementation of United States nonproliferation policy and is also valuable in negotiating and monitoring international nuclear agreements and proposed nuclear-related exports. Specific activities within the program are initiated and pursued in coordination with the National Intelligence Office for Nuclear Proliferation. [Deleted.]

[Deleted] the program relies heavily on its access to the skills and experience of the Department of Energy's nuclear weapons complex.

Two important activities are the management of the Strategic Tracking and Materials Analysis System, which estimates worldwide trends in inventories and flows of plutonium and highly enriched uranium and our proliferation [deleted] training courses. The Strategic Tracking and Materials Analysis System effort complements the Nuclear Materials Inventory System operated by Department of Energy's Office of Safeguards and Security in tracking nuclear materials of U.S. origin. The training courses enable [deleted] personnel to become familiar with the nuclear fuel cycle, alternative routes to nuclear weapons proliferation, and the current status of nuclear proliferation activities worldwide.

ARMS CONTROL

The direct relationship between the nuclear weapons program and arms control requires Departmental participation in arms control policymaking, negotiations, and implementation. In fiscal year 1985, we will participate in the Non-Proliferation Treaty review conferences, the United Nations Conference on Disarmament and negotiations on possible nuclear test limitation agreements. We will continue taking part in several interagency policy committees and in other committees supporting negotiations, and arrange for weapons laboratories' scientists to provide technical representation as necessary. We will continue to provide technical representation as necessary. We will continue to provide support to the Conference on Disarmament working groups negotiating a treaty banning radiological weapons and investigating

verification and compliance issues associated with a Comprehensive Test Ban Treaty.

The Department will also continue to be represented in major interagency reviews of arms control policy that are relevant to the nuclear weapons program.

EXPORT CONTROL, TECHNOLOGY TRANSFER, AND INTERNATIONAL EXCHANGE

We will continue to review proposed nuclear and energy-related exports, technology transfer, and international cooperation and exchange agreements to ensure their consistency with United States national security and nonproliferation objectives.

Because of the unique experience and resources of the Department of Energy nuclear weapons complex, we will also be called upon to support the Department of Defense in identifying emerging and militarily critical technologies and to support the Departments of State and Commerce in carrying out their responsibilities for controlling United States exports and international cooperation and exchanges; make recommendations to the Nuclear Regulatory Commission regarding exports of nuclear materials, reactors, and equipment specially—designed for nuclear purposes; control Naval and maritime nuclear propulsion in coordination with Department of Energy's Office of Naval Reactors.

CAPITAL EQUIPMENT

Capital equipment expenditures support research, development, test, and production activities through the provision of test equipment and instrumentation related to the total program. There is a continuing need to update test equipment at the Sandia National Laboratories, the Lawence Livermore National Laboratory and the Los Alamos National Laboratory. Most equipment is small-scale bench test equipment such as oscilloscopes, electronic calibration devices, and small-scale electronic support devices. Additionally, specialized equipment is needed in the analysis of weapons, proliferation, and export control issues.

The fiscal year 1985 request for capital equipment is $2 million, a slight increase over the 1984 figure of $1.8 million.

CONSTRUCTION

To ensure that we can meet requirements for spaceborne sensors in the late 1980's and beyond, the Department is requesting $1 million to begin building a Space Science Laboratory at Los Alamos. It would be completed by fiscal year 1987 at a total estimated cost of $7.5 million.

This facility will enable us to:

Meet delivery commitments for spaceborne sensors;

Improve productivity of sensor fabrication, testing, and post deployment support;

Meet quality assurance and health and safety standards; and

Accommodate a projected increased workload.

Projects planned for this facility pose significant technological challenges to our scientists and engineers, in some case calling for development of virtually new technologies before even prototype sensors can be deployed. Present facilities can barely meet the technical demands of current research and development and fabrication activities, much less the development of new technologies and the stepped-up fabrication and delivery schedule.

In addition to impeding the successful development of new technologies, our present facilities would probably increase the cost of development because the sensors would have to undergo manual testing. Manual testing is not only less likely to meet stringent quality assurance standards, but also is very time consuming and increases the risk of missing a delivery commitment.

Another factor contributing to the need for the new facility is that most satellites on which Departmental sensors will ride will be deployed by the space shuttle. Unlike satellite launches by unmanned rockets, shuttle-deployed satellites must meet more rigorous quality and testing standards to ensure the safety of the shuttle crew.

PROGRAM DIRECTION

Program direction funds provide for the salaries, benefits, and travel expenses for 60 FTF's, the same as the fiscal year 1984 request. These employees are responsible for technical and analytical program management of field activities, and execution of Headquarters staff functions.

FISCAL YEAR 1984 SUPPLEMENTAL REQUEST

In addition to the fiscal year 1985 request, we also have $6.2 million in the fiscal year 1984 supplemental request. The additional resources are required to support two high priority activities: the satellite instrumentation program and analytical intelligence. In the satellite instrumentation program, an additional $4.2 million is required to maintain the latest scheduled production of nuclear explosion detection sensors for the Global Positioning System satellites. When the fiscal year 1984 budget was originally developed, the Department planned to deliver two Global Positioning System payloads in fiscal year 1985. However, as a result of an Air Force decision to procure the Global Positioning System satellites on an assembly line basis, rather than a few satellites at a time as was previously the case, the Department must now deliver five sensor packages in fiscal year 1985. The additional $4.2 million will support the advance procurement and fabrication activities which must be conducted this fiscal year in order to meet the revised fiscal year 1985 delivery schedule. [Deleted.]

PREPARED STATEMENT OF F. CHARLES GILBERT, DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS, DEPARTMENT OF ENERGY

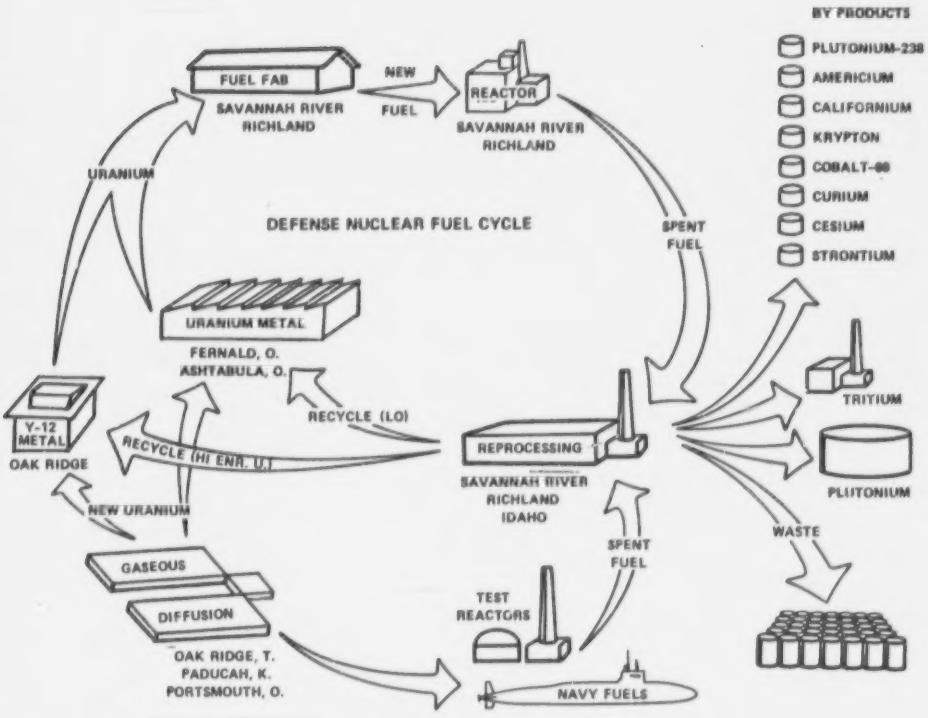
Mr. Chairman and members of the committee. It is a pleasure to discuss with you the Department of Energy's fiscal year 1985 Nuclear Materials program. This program is made up of two major components, materials production and defense waste and byproducts management.

The Nuclear Materials' fiscal year 1985 request for $2.59 billion in budget authorization includes $1.85 billion for Nuclear Materials Production and $743 million for Defense Waste and Byproducts Management. We are also requesting a fiscal year 1984 supplemental appropriation of $86 million for Materials Production to alleviate security and environmental concerns and to ensure the availability of highly enriched uranium to meet weapons requirements.

NUCLEAR MATERIALS PRODUCTION REQUIREMENTS

The Nuclear Materials Production program is responsible for producing nuclear materials for use in military, Government research and development, and civilian programs that use radioisotopes for research, commerical, and medical applications. Of these, the primary objective is providing special nuclear materials for national defense requirements.

DEFENSE NUCLEAR FUEL CYCLE



The facilities involved in the production of special nuclear materials are located at six major sites. Oak Ridge, Fernald, and Ashtabula provide uranium of proper enrichment levels to act as feed for production reactors. Savannah River and Richland fabricate these feed materials into fuel or targets. The Savannah River reactors produce both plutonium and tritium. The N Reactor at Richland produces weapon-grade plutonium. These sites then process the irradiated fuels to recover plutonium, tritium, and other valuable materials and byproducts. Idaho receives, stores and processes fuels from Navy propulsion, research, and test reactors to recover residual enriched uranium primarily for use as fuel for the Savannah River reactors.

NUCLEAR WEAPONS STOCKPILE

The Nuclear Materials Production budget is driven by the requirements for tritium, plutonium, and enriched uranium set forth in the Nuclear Weapons Stockpile Memorandum approved annually by the President. The fiscal year 1984 Nuclear Weapons Stockpile Memorandum, signed by the President on February 16, 1984, contains stockpile requirements projected through fiscal year 1999.

The total number of weapons has decreased from a high [deleted] in 1967 to a low [deleted] in 1982 and is projected to return to a level of [deleted]. Older weapons are continuously being retired and replaced with newer, safer, and smaller weapons. You will note that this long-range projection assumes retirement [deleted] of the current older weapons [deleted]. Most of the nuclear material for the modernized weapons comes from these retired weapons. However, the modest increase in the total number of weapons, along with the increase in plutonium and tritium required per weapon, drives the demand for these materials.

[Deleted.] Plutonium equivalent is a weighted sum of both plutonium and tritium. [Deleted.]

NUCLEAR MATERIALS REQUIREMENTS

We have just looked at the number of weapons included in the current stockpile projections. Now we can look at the corresponding material requirements. [Deleted.]

[Deleted.] Most of the nuclear materials required for building new warheads are obtained by reclaiming and recycling existing materials from retired weapons, returned by the Department of Defense to the Department of Energy. Material requirements which cannot be met from Department of Defense returns or existing inventories must be satisfied by new production. [Deleted.]

Allow me to spend just a minute or two explaining how we expect to fill this demand.

Here we have the projected annual production rates by source for plutonium equivalent through fiscal year 1999. The increase in production is due largely to our fiscal year 1981 production intiiatives—efforts this committee has strongly supported. [Deleted.]

[Deleted.] Among the new initiatives responsible for the future rise in production are plutonium blending, higher productivity Mark-15 reactor cores, the facilities restoration program, conversion of the N Reactor to weapon-grade plutonium production, and the projected startup of a special isotope separation facility. [Deleted.]

[Deleted.] The weapons program has operated within the existing inventory of enriched uranium for the last 20 years by recycling material from retired warheads. Although recycling continues, a need for new quantities of highly enriched uranium is projected, starting about fiscal year 1988.

FISCAL YEAR 1984 SUPPLEMENTAL REQUEST

NUCLEAR MATERIALS PRODUCTION
FY 1984 SUPPLEMENTAL REQUEST
(DOLLARS IN MILLIONS)

	TEC	REQUEST
WEAPONS SUPPORT		
OPERATING EXPENSES, OR		$ 0.5
84-D-136 ENRICHED URANIUM CONVERSION FACILITY, OR	$ 20.6	$ 4.4
		4.9
SECURITY		
OPERATING EXPENSES, SR		20.0
82-D-127 SAFEGUARDS IMPROVEMENTS, SR	34.6	9.9
84-D-134 SAFEGUARDS AND SECURITY IMPROVEMENT, SR	47.8	12.0
84-D-137 FACILITY SECURITY SYSTEMS UPGRADE, ID	10.0	2.0
		43.9
ENVIRONMENTAL		
OPERATING EXPENSES, SR		30.0
83-D-147 POLLUTION DISCHARGE ELIMINATION, SR	9.65	3.5
83-D-148 NONRADIOACTIVE HAZARDOUS WASTE MANAGEMENT, SR	22.1	3.5
		37.0
TOTAL NUCLEAR MATERIALS PRODUCTION		$85.8

Before I specifically discuss the fiscal year 1985 budget, I would like to describe our need for additional fiscal year 1984 funding. We are requesting a supplemental budget of $85,800,000 to meet material production, security, and environmental requirements that have risen subsequent to establishment of our current fiscal year 1984 budget.

URANIUM SUPPLY

First, $4,900,000 is required to reactivate the existing dry chemistry facility at the Oak Ridge Y-12 Plant.

This facility converts highly enriched gaseous uranium hexafluoride to solid uranium tetrafluoride, a form that is needed to make uranium metal. The existing facility was shut down in 1964 because projections then indicated that our highly enriched uranium inventory was sufficient for many years. The facility is now needed [Deleted.] Highly enriched uranium metal is used directly as a component of nuclear weapons and as fuel for the Savannah River reactors. It is also used in the Department's research and test reactors. [Deleted] it is essential that the Oak Ridge dry chemistry facility be operational in early fiscal year 1988. [Deleted.]

SECURITY

[Deleted.] Savannah river's role as the United States primary producer of tritium and plutonium for weapons has been receiving increased media and public attention, increasing the risk of terrorist acts. We have experienced several minor demonstrations there during the past year. As a result, we have taken a comprehensive look at the security measures at Savannah River. The Department's Office of Safeguards and Security, the Office of the Inspector General, and the Savannah River Office of Safeguards and Security have conducted assessments of Savannah River's security measures. [Deleted.]

[Deleted.]

NUCLEAR MATERIALS PRODUCTION
FY 1984 SUPPLEMENTAL REQUEST
ENVIRONMENTAL

	APPROP.
OPERATING EXPENSES, SR	**$30.0**
• FUEL FABRICATION AREA SEEPAGE BASIC PHASE-OUT DEMONSTRATION PROJECT ($15.0 MILLION)	
– REMOVE HAZARDOUS CONSTITUENTS FROM WASTE STREAM	
– ALLOW DISCHARGE TO SURFACE WATERS IN ACCORD WITH NPDES	
• GROUNDWATER CONTROL ACTIVITIES ($15.0 MILLION)	
– NOT IN FULL COMPLIANCE WITH CLEAN WATER ACT	
– SOME GROUNDWATER CONTAMINATED	
– DECONTAMINATE GROUNDWATER IN M-AREA	
– GROUNDWATER CONTAMINATION INVESTIGATION	
83-D-147 POLLUTION DISCHARGE ELIMINATION	**3.5**
• TEC $9.65 MILLION; FY 84 APPROP. $2.0 MILLION	
• CONTROL LIQUID EFFLUENTS	
• ADVANCES COMPLETION 9 MONTHS	
83-D-148 NONRADIOACTIVE HAZARDOUS WASTE MANAGEMENT	**3.5**
• TEC $22.1 MILLION; FY 84 APPROP. $3.0 MILLION	
• TREAT AND DISPOSE OF HAZARDOUS WASTES	
• ADVANCES COMPLETION BY 6 MONTHS	

Finally, our supplemental request provides $37,000,000 to initiate or accelerate several environmental activities needed to bring the Savannah River Plant into compliance with appropriate State and Federal environmental regulations. Savannah River was recently granted a new national pollutant discharge elimination system permit to allow continued operation of the three currently operating reactors. A consent order provides a delay in full compliance until thermal mitigation measures can be put in place. Negotiations for the new permit were difficult since the point of compliance for reactor thermal discharge must now be where thermal effluents enter the site streams rather than where the site streams enter the Savannah River as previously required. The new permit places even more stringent re-

quirements on plant operations. Failure to proceed to bring the Savannah River Plant into compliance could result in legal action by the State of South Carolina and environmental organizations, which could potentially impact many operations at the Savannah River Plant.

The requested funding will be used to begin decommissioning the fuel fabrication area seepage basin that has contaminated the groundwater in the vicinity of the facility with chlorocarbon degreasing chemicals, accelerate construction of facilities to control hazardous liquid effluents, and treat and dispose of other hazardous wastes generated onsite.

This completes my discussion of the supplemental budget request necessary to support planned additional fiscal year 1984 production, security, and environmental activities.

FISCAL YEAR 1985 BUDGET REQUEST

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1984 APPROP.	FY 1985 APPROP.
BASE ACTIVITIES		
CURRENT OPERATIONS	$ 933.6	$1,105.0
L REACTOR	64.5	65.0
PUREX	88.7	90.8
SECURITY	102.1	96.8
ENVIRONMENTAL	59.3	58.1
SUBTOTAL	$1,248.2	$1,415.7
PRODUCTION INITIATIVES		
RESTORATION	$ 107.6	$ 84.5
IDAHO RESTORATION	5.5	14.1
PRODUCTIVITY IMPROVEMENTS	25.3	50.7
MARK 15 CORES	4.0	113.5
SPECIAL ISOTOPE SEPARATION	71.9	39.0
PROCESS FACILITY MODIFICATION	12.5	0.0
REACTOR SAFETY	26.7	25.7
SUBTOTAL	$ 253.5	$ 327.5
OTHER		
NAVAL REACTOR SUPPORT	$ 120.0	$ 121.0
TOTAL MATERIALS PRODUCTION	$1,621.7	$1,864.2

As I mentioned earlier, we are requesting $1.85 billion in fiscal year 1985 for support of the Materials Production program. Of this amount, $1.41 billion is needed for continuing base activities, production activities, $316 million for production initiatives, and $121 million for highly enriched uranium for the nuclear Navy.

BASE ACTIVITIES

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
BASE ACTIVITIES

- OPERATE THREE SAVANNAH RIVER REACTORS TO PRODUCE 3 PERCENT PU-240 PLUTONIUM AND TRITIUM
- OPERATE L REACTOR AT SAVANNAH RIVER
- OPERATE RICHLAND N REACTOR TO PRODUCE WEAPON-GRADE PLUTONIUM AND BY-PRODUCT STEAM
- OPERATE TWO PROCESSING CANYONS AT SAVANNAH RIVER TO RECOVER PLUTONIUM AND TRITIUM
- OPERATE PUREX PROCESSING PLANT AT RICHLAND
- OPERATE IDAHO CHEMICAL PROCESSING PLANT TO PROCESS NAVY, R&D, AND OTHER SPENT FUELS
- OPERATE FEED PRODUCTION PLANTS AT FERNALD AND ASHTABULA, OHIO, AND OAK RIDGE, TENNESSEE
- CONTINUE ACTIVITIES TO SUPPORT THE PRODUCTION AND PROCESSING OF NUCLEAR MATERIALS
- CONTINUE PRIOR YEAR CONSTRUCTION PROJECTS
- BEGIN TWO NEW CONSTRUCTION PROJECTS TO PROVIDE A MORE EFFICIENT PROCESS TO PRODUCE REACTOR FUEL TUBES AT SR AND TO CENTRALIZE URANYL NITRATE CONVERSION OPERATIONS [Deleted]

Meeting program objectives requires operation of four Savannah River reactors, including the L Reactor, the Richland N Reactor, four chemical processing plants, reactor fuel fabrication facilities, utilities; and other site support facilities. The base program also supports processing of naval and research and development reactor spent fuels and nonspecification nuclear materials to supplement new production. Considerable funding is required for maintenance and equipment replacement, and for security and environmental improvements.

The fiscal year 1985 budget supports the first full year of operation of the PUREX fuel processing plant and supporting facilities at Richland. PUREX will process newly irradiated fuel from N Reactor, as well as fuel that has been stored since 1972, to recover weapon-grade and fuel-grade plutonium for blending or special isotope separation feed. PUREX was reactivated in November 1983, 5 months ahead of schedule. We are very grateful to this committee for providing the strong support that enabled us to complete this important milestone.

NEW PRODUCTION REACTOR

A new production reactor is expected to be required to assure a reliable supply of tritium that is vital to maintaining the effectiveness of the nuclear weapons in our stockpile. We currently produce tritium in the Savannah River reactors that are already 30 years old. Additionally, the Richland N Reactor is expected to reach the end of its useful life by the mid-nineties. A new reactor would provide reliable tritium production as well as the capability to produce other reactor materials well into the next century. Accordingly, it is prudent that the activities leading to selection of a reactor concept and site for construction continue to proceed in a timely manner.

NEW PRODUCTION REACTOR

- **COST ESTIMATES**
  - **CONDUCT PRE-CONCEPTUAL DESIGN STUDIES**
  - **DEVELOP ASSOCIATED CONCEPT & SUPPORT FACIL. COSTS**
  - **DETERMINE LIFECYCLE & PRODUCT UNIT COSTS**
  - **PROVIDE PROJECT/MANAGEMENT PLANS**
- **SYSTEMS ENGINEERING**
  - **DEFINE FUNCTIONAL & OPERATIONAL CHARACTERISTICS OF SUPPORT FACILITIES**
  - **SUPPORT CRITICAL REACTOR TECHNOLOGY R&D**
- **SAFETY STUDIES**
  - **DEVELOP SOURCE TERMS**
  - **EVALUATE CONCEPTS & SUPPORT FACILITIES**
  - **EVALUATE COMPONENT OPERABILITY & AVAILABILITY**
  - **DEFINE SAFETY MARGINS & DEVELOP MODELS**
- **ENVIRONMENTAL STUDIES**
  - **GATHER ENVIRONMENTAL DATA TO SUPPORT FUTURE NEPA DOCUMENTATION**
  - **PLACE ENVIRONMENTAL STUDIES CONTRACT WITH OPTION FOR EIS PREPARATION**
- **PREPARATION OF ENVIRONMENTAL REPORT**

Starting in fiscal year 1984, the Department initiated a series of activities to provide a suitable basis for recommending to the President in mid-fiscal year 1985 a reactor concept for the new production reactor and the site where it should be located. An NPR Project Office has been established to prepare site-specific cost estimates, conduct systems and safety studies, and prepare environmental analyses for three candidate DOE sites—Richland, Idaho, and Savannah River—and the principal candidate reactor concepts—heavy water, light water, and gas cooled. Fiscal year 1985 funding of $5 million is requested to complete these activities by mid-fiscal year 1985, so the issue of a new production reactor may be fully considered in the fiscal year 1986 budget process.

L REACTOR

Our fiscal year 1985 request includes funding for operating L Reactor at Savannah River. The construction program to upgrade L Reactor, initiated in fiscal year 1981, was completed in October 1983 on schedule. The Department is currently preparing an environmental impact statement scheduled to be published in April 1984. The schedule for restart of the reactor will be determined after publication of the Record of Decision in May. Since L Reactor will add [deleted] plutonium equivalent annually to the weapons program, it is extremely important to restart and bring it to full operation as soon as possible. We hope to be able to restart the reactor about the end of calendar year 1984.

SECURITY

[Deleted.]

ENVIRONMENTAL UPGRADES

DOE is taking action to comply with applicable environmental laws. Groundwater contamination has been identified at various locations on the Savannah River site, and legislation passed by the Congress and signed into law requires terminating use of certain seepage basins by November 30, 1985. To accomplish these objectives, the fiscal year 1985 request includes funding to continue the environmental cleanup program at the Savannah River Plant including: the elimination of hazardous in-

dustrial waste discharges to ground and surface waters; the cleanup of groundwater contamination; the deactivation of seepage basins in the fuel fabrication area; and reactor thermal discharge mitigation measures. The requested funding is required to conduct planned evaluations and define and undertake necessary mitigation activities.

The Feed Materials Production Center at Fernald, Ohio, will continue its water pollution control project to provide facilities by July 1, 1986, needed for compliance with the objectives of the Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977. The pollutants of primary concern are nitrates, ammonia, chlorides, suspended solids, and acidity of the coal pile drainage.

FACILITIES RESTORATION

NUCLEAR MATERIALS PRODUCTION FY 1985 BUDGET REQUEST

FACILITY RESTORATION PROGRAM

- **PROGRAM OBJECTIVE IS TO CORRECT ACCUMULATED DEFICIENCIES TO RESTORE THE OPERATING CAPABILITIES OF THE PRODUCTION COMPLEX**
- **TOTAL PROGRAM COST, EXCLUDING IDAHO, IS $462 MILLION FUNDED OVER 6 YEARS**
- **FY 1985 FUNDING REQUEST IS $84.5 MILLION AUTHORIZATION AND APPROPRIATION**
  - **$72.8 MILLION PROJECT 82-D-124**
  - **$11.7 MILLION OPERATING EXPENSE**
- **THROUGH FY 1984 CONGRESS HAS AUTHORIZED AND APPROPRIATED $315 MILLION FOR THIS PROGRAM**

The facilities restoration program is in the fifth year of a six-year funding schedule. This program will restore the production capability of much of the complex that dimished during the 1970's. Without the restoration program, our facilities, now approximately 30 years old, would rapidly deteriorate or become obsolete. This would cause a significant decrease in production capability and efficiency and would result in production losses that could not be recovered. Your continued support of the restoration program is vital since we cannot achieve our production goals without a fully functioning production complex.

IDAHO RESTORATION

IDAHO FUEL PROCESSING RESTORATION (PROJECT 85-D-139)

- **REQUIRED BY 1992 TO PROCESS PLANNED RECEIPTS OF NAVAL REACTORS SPENT FUEL**
- **RECOVERED HIGHLY ENRICHED URANIUM PROVIDES PRINCIPAL SOURCE OF FUEL FOR SR REACTORS**
- **PROVIDES THE MOST COST-EFFECTIVE ALTERNATIVE FOR MEETING NAVAL FUEL RECEIPT REQUIREMENTS AND FUELING SR REACTORS BASED ON CURRENT COST/BENEFIT ANALYSES**
- **RESTORES AGING PILOT PLANT BUILT IN 1951 TO DEMONSTRATE NAVY FUEL PROCESSING CAPABILITY**
- **PRELIMINARY PROJECT TEC $230M — FY 1985 REQUEST $10M FOR DESIGN**

Facilities at the Idaho site were not included in our Facility Restoration program. [Deleted.] We are requesting funding for a design-only project at Idaho to increase capacity and ensure reliability sufficient to process the scheduled fuel returns. The conservation of resources in recovering this enriched uranium at Idaho is cost beneficial for the operation of the Savannah River reactor because it greatly reduces the amount of new highly enriched uranium that must be produced or withdrawn from the Oak Ridge inventory.

PRODUCTIVITY IMPROVEMENTS

Our fiscal year 1985 request includes $50.7 million for three activities to improve the reliability and efficiency of our facilities.

During fiscal year 1984 we initiated research and development on techniques for improving the fuel cycle performance of the Savannah River reactors. This activity has considerable promise and cost benefits for the Materials Production program. The fuel cycle improvements program uses the plasma separation process, being developed by TRW, for the removal of unwanted isotopes of uranium from the recycled uranium fuel used in the Savannah River Plant reactors. A fuel cycle improvement development facility could increase reactor production and decrease the need to purchase new uranium from the Department's gaseous diffusion plants. Since less fuel fabrication alloy material is necessary, due to the reduced uranium content, waste management costs will also be reduced. The total cost of the fuel improvement process development facility is estimated to be $90 million with a projected payback period of 4 years. Once operational, this program will result in annual net savings of over $37 million for as long as the Savannah River reactors continue to operate.

At Fernald, Ohio, a productivity and radiological improvements program is planned to ensure the continued, safe, reliable, and efficient operation of our reactor fuel fabrication facilities. Since 1981 we have increased the use of this plant from some 20–30 percent of capacity to about 70 percent and, as a result, several existing

facilities need to be upgraded or modernized to continue feed production for production reactors and weapons component fabrication plants.

Richland will continue the N Reactor productivity improvements program to maintain current state-of-the-art technology levels and to meet stricter safety and environmental requirements.

MARK-15 CORES

The high productivity Mark 15 core will replace the current Savannah River reactor fuel with slightly enriched uranium fuel to provide a uniform fuel core loading. Mark 15 cores will increase plutonium metal production [deleted] for each reactor operating to produce plutonium. This results in an overall increase [deleted] in total plutonium equivalent production, [deleted] gain through the planning period, from the Savannah River reactors, based on our current plutonium and tritium production plans. Our request of $113.5 million includes $23 million to prepare for the conversion to the Mark 15 operating mode with the first reactor converted in late fiscal year 1986 and $90.5 million for the purchase of slightly enriched uranium from the gaseous diffusion plants.

SPECIAL ISOTOPE SEPARATION

The fiscal year 1985 budget provides $39 million for continuing the plutonium special isotope separation program and provides for the continuation of atomic vapor laser isotope separation process research and development. It reflects the assessment that a somewhat longer period of research and development is needed before construction of an atomic vapor laser isotope separation production prototype facility. It will enable the Lawrence Livermore National Laboratory to continue experiments begun in fiscal year 1984, will support the development of a plutonium atomic vapor laser isotope separation process demonstration system in fiscal year 1987, and will provide for continuation of developmental support activities at the Hanford site, including the conceptual design of the facilities and equipment needed for an atomic vapor laser isotope separation production prototype facility with operation in fiscal year 1989. The status of plutonium laser isotope separation technology will be reviewed before the end of fiscal year 1984, by a joint Office of Science and Technology Policy-Department of Energy panel, to determine whether any changes are required in the planned program.

The Process Facility Modification Project, initiated in fiscal year 1984, is being delayed 1 year, consistent with the delay in the special isotope separation program. In the longer term, however, the additional defense programs-origin recovered plutonium made available by this project could be utilized for blending without a special isotope separation facility.

We will continue funding the Los Alamos National Laboratory molecular laser isotope separation process to produce special isotopes [deleted]. We are requesting $15 million to continue molecular laser isotope separation process development as part of our base program.

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REACTOR SAFETY

- **FY 1985 BUDGET INCLUDES $14.4 MILLION OPERATING AND $11.3 MILLION CONSTRUCTION**
- **OPERATING FUNDING PROVIDES:**
  - **REACTOR OPERATOR TRAINING AT SR AND RL**
  - **REACTOR SIMULATOR DEVELOPMENT AT RL**
  - **MODIFICATIONS TO SR AND RL REACTORS TO REDUCE THE RISK OF ACCIDENTS**
- **PROJECT 82-D-126, REACTOR SAFETY AND RELIABILITY, TEC $40.6 MILLION**
  - **RL — $5.5 MILLION FOR EMERGENCY SHUTDOWN PANEL AND CONTROL ROOM ISOLATION**
  - **SR — $5.8 MILLION FOR COMPLETING REACTOR SIMULATOR TRAINING FACILITY AND REMOTE DETECTION AND CONTROL CAPABILITY**

The reactor safety program, begun in fiscal year 1981, will reduce the probability of accidents, enhance safe operations, and improve our capability to manage emergency conditions. Fiscal year 1985 funding will be used to train new and current contractor employees on reactor operation by simulation of real-life situations, to conduct nondestructive testing of reactor internals, to improve reactor coolant instrumentation and computerization, to develop lessons-learned studies, and to produce engineering safety studies. [Deleted.]

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
NEW CONSTRUCTION PROJECTS
(DOLLARS IN MILLIONS)

		TEC	AUTH.	BA
85-D-131	GENERAL PLANT PROJECTS, VL	$32.0	$32.0	$32.0
85-D-132	PLANT ENGINEERING AND DESIGN	2.0	2.0	2.0
85-D-136	COMPONENTS PROTECTION SYSTEM, 100-N AREA, RL	3.3	3.3	3.3
85-D-137	VAULT SAFETY SNM INVENTORY SYSTEM, RL	4.4	2.5	2.5
85-D-139	FUEL PROCESSING RESTORATION, IFPF, ID	10.0*	10.0	10.0
85-D-140	PRODUCTIVITY AND RADIOLOGICAL IMPROVEMENTS, FMPC, OR	47.0	6.0	6.0
85-D-142	U_3O_8 FUEL TUBE FACILITIES, SR	15.5	8.0	8.0
85-D-145	URANYL NITRATE TO OXIDE CONVERSION FACILITY, SR	1.8*	1.8	1.8
	TOTAL NEW CONSTRUCTION PROJECTS		$65.6	$65.6

*PARTIAL DESIGN ONLY.

I have already discussed most of our new construction projects as they relate to major issues. Our request also includes an important new project for a uranium nitrate to oxide conversion facility at Savannah River. This project will replace deteriorating equipment and facilities at our Oak Ridge Y-12 Plant, [deleted].

[Deleted] and will prevent operational interruptions.

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
CONTINUING CONSTRUCTION PROJECTS
(DOLLARS IN MILLIONS)

		TEC	THRU FY 1984		FY 1985	
			AUTH.	B/A	AUTH.	B/A
84-D-130	MODIFICATIONS PROCESSING FACILITY SUBSTATIONS, SR	$ 5.8	$ 5.6	$ 5.6	$ 0.2	$ 0.2
84-D-134	SAFEGUARDS AND SECURITY IMPROVEMENTS, PLANT-WIDE, SR	47.8	12.0	12.0	14.9	14.9
84-D-135	PROCESS FACILITY MODIFICATIONS, RL	155.0	7.5	7.5	0.0	0.0
84-D-136	ENRICHED URANIUM CONVERSION FACILITY MODIFICATIONS, Y-12 PLANT, OR	20.6	4.4	4.4	8.0	8.0
84-D-137	FACILITY SECURITY SYSTEMS UPGRADE, IFPF, ID	10.0	2.0	2.0	8.0	8.0
83-D-146	WATER POLLUTION CONTROL, OR	9.5	5.4	5.4	4.1	4.1
83-D-147	POLLUTION DISCHARGE ELIMINATION, SR	9.7	6.5	6.5	2.1	2.1

Our request includes second year funding for the three new projects requested as part of the fiscal year 1984 supplemental. These projects are 84-D-134, Safeguards and Security Improvements, at Savannah River; 84-D-136, Enriched Uranium Conversion Facility Modifications, at Oak Ridge; and 84-D-137, Facility Security Systems Upgrade, at Idaho.

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
CONTINUING CONSTRUCTION PROJECTS
(DOLLARS IN MILLIONS)
(CONTINUED)

		TEC	THRU FY 1984 AUTH.	THRU FY 1984 B/A	FY 1985 AUTH.	FY 1985 B/A
83-D-148	NON-RADIOACTIVE HAZARDOUS WASTE MGMT, SR	$ 22.1	$ 7.5	$ 7.5	$ 11.5	$ 11.5
83-D-180	FACILITY STORAGE MODIFICATIONS, VL	15.8	9.3	9.3	6.5	6.5
82-D-124	RESTORATION OF PRODUCTION CAPABILITIES, PHASE II, III, IV, AND V, VL	367.3	239.3	231.8	72.8	72.8
82-D-128	REACTOR SAFETY AND RELIABILITY, VL	40.6	42.9	27.5	0.0	11.3
82-D-127	SAFEGUARDS IMPROVEMENTS, SR	34.6	34.6	27.9	0.0	6.7
82-D-128	PLANT PERIMETER SECURITY SYSTEMS UPGRADE, ID	5.4	5.0	5.0	0.4	0.4
82-D-136	FUEL PROCESSING FACILITIES UPGRADE, ID	46.0	46.0	45.0	1.0	1.0
82-D-201	SPECIAL PLUTONIUM RECOVERY FACILITIES, SR	65.8	37.0	37.0	28.8	28.8
					$158.3	$176.3

Our fiscal year 1985 request includes final year funding for 82-D-201, Special Plutonium Recovery Facilities, at Savannah River. [Deleted.]

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST HIGHLIGHTS

- **CONTINUES CURRENT PRODUCTION BASE ACTIVITIES IN FY 1985**
- **SUPPORTS PRODUCTION INITIATIVES BEGUN IN PREVIOUS YEARS**
  - FUNDS FACILITIES RESTORATION PROGRAMS, INCLUDING IDAHO
  - FUNDS FIRST FULL YEAR OF PUREX OPERATIONS
  - FUNDS FIRST YEAR OF L REACTOR OPERATION AT SAVANNAH RIVER
  - CONTINUES MARK 15 ACTIVITIES
  - CONTINUES SPECIAL ISOTOPE SEPARATION R&D
  - CONTINUES NEW PRODUCTION REACTOR STUDIES
- **FUNDS URANIUM ENRICHING SERVICES FOR MATERIALS PRODUCTION AND NAVAL REACTORS**
- **FUNDS PRIORITY SECURITY AND ENVIRONMENTAL ACTIVITIES**

In summary, the major elements of our proposed fiscal year 1985 Materials Production budget are directed towards meeting the Nuclear Weapons Stockpile Memorandum requirements and achieving enhanced safety, security, and environmental protection. We plan to:

Continue in fiscal year 1985 the base production activities ongoing in fiscal year 1984,

Continue initiatives to increase production,

Purchase enriched uranium for materials production and nuclear navy requirements, and

Alleviate [deleted] envrionmental concerns of production sites.

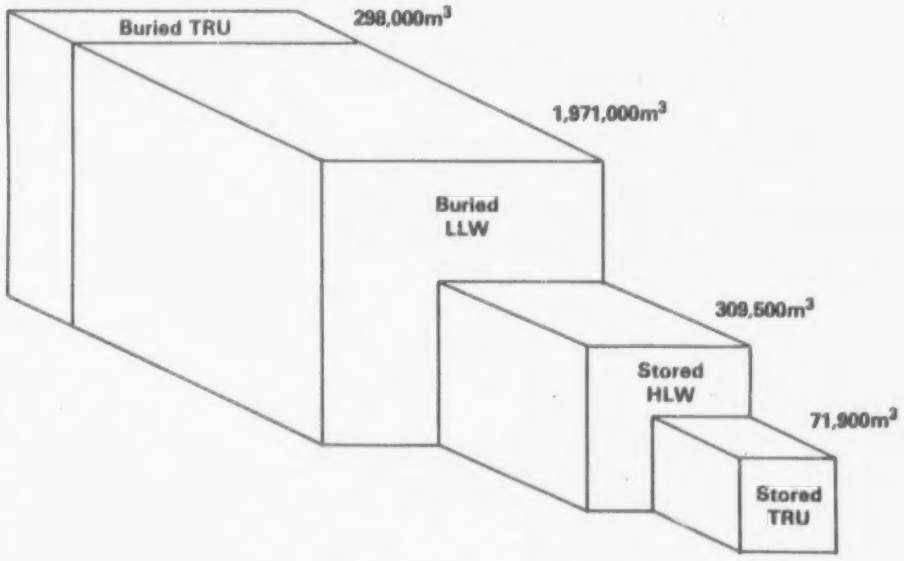
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

I would now like to turn to the Defense Waste and Byproducts Management Program. This program provides for the management of radioactive waste generated primarily by the Department's defense activities in support of the production of nuclear materials and weapons, the nuclear Navy and other R&D activities of the Department. It includes the development of technologies and facilities for storage and disposal of high-level, transuranic, and low-level wastes, and for utiiization of byproducts.

The goal of the Defense Waste and Byproducts Management program is to manage defense nuclear waste routinely, safely, and effectively. This goal includes the disposal of the backlog of stored defense waste located at the sites shown on the chart.

HIGH-LEVEL WASTE AND TRANSURANIC WASTE STORAGE SITES

Defense Waste Inventory



The next chart shows the volume of waste that has been generated from over 30 years of nuclear material production activities. Although we are continuing to generate high-level waste, our volumetric inventory remains relatively constant due to our waste concentration efforts. In addition, we are continuing to add about 5,500 cubic meters of transuranic waste each year.

In June 1983 the President submitted to you the Defense Waste Management Plan which reflects our plans for permanent disposal of high-level and transuranic waste in response to Public Law 97-90. It shows a reasonable and affordable way to meet this goal through the implementation of the policy shown on the chart.

DEFENSE WASTE MANAGEMENT PLAN DISPOSAL STRATEGY

- READILY RETRIEVABLE WASTE TO GEOLOGIC DISPOSAL
- ALL OTHER TO BE RETRIEVED IF BENEFITS JUSTIFY COSTS AND RISKS
- OTHERWISE: STABILIZE IN PLACE
- RETRIEVED TRU WILL BE MADE ACCEPTABLE TO WIPP
- IMMOBILIZED HIGH LEVEL WASTE TO COMMERCIAL REPOSITORY BARRING ADVERSE IMPACTS ON DEFENSE PROGRAMS

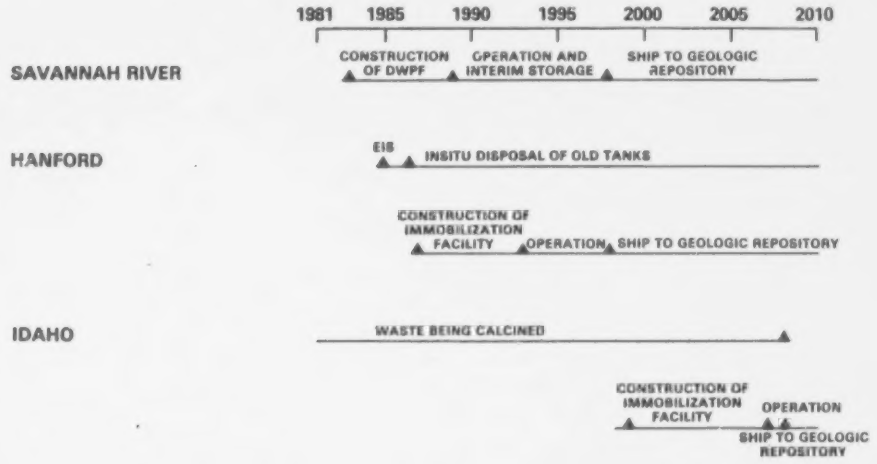
By careful evaluation of risks and benefits, and through technological improvements, we feel the costs to implement the program are reasonable. We will continue to dispose of low-level waste on the sites where it is generated.

Our fiscal year 1985 budget is consistent with the policies contained in the Defense Waste Management Plan. With very few exceptions, we are maintaining the schedules reflected in the plan. As I discuss each major area of the plan, I will point out the exception. New activities in fiscal year 1986 and beyond will be evaluated annually, during the normal budget cycle, in terms of their scope, timing, need, and relative ranking compared to other Departmental priorities. I will describe our overall plans for disposing of defense high-level waste and transuranic waste through the year 2015.

HIGH-LEVEL WASTE

High level waste is, in general, that highly radioactive waste that originates as a liquid from our defense fuel reprocessing sites at Savannah River, Idaho, and Hanford. Our first objective is to end interim storage of high-level waste in tanks and bins and achieve permanent disposal by immobilizing and preparing high-level waste for shipment to a geologic repository. Our schedule for accomplishing this task is shown on the chart.

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE HIGH-LEVEL WASTE



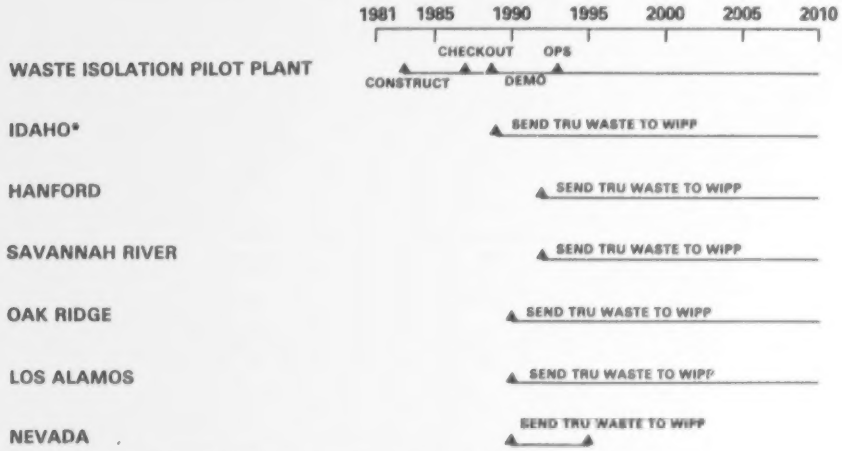
We are right on schedule with regard to construction of the Defense Waste Processing Facility at Savannah River. Construction began in October 1983 and we expect to complete it in 1988 and begin operations in 1989. With regard to Hanford, our original schedule was somewhat ambitious. Because of the need to firm up the requirements and planning for the immobilization plant at that site, construction originally planned for 1985 is not expected to begin until at least FY 1987. We are spending the interim time planning in order to minimize the processes and costs of the facility. With regard to Idaho, the newly completed Waste Calcining Facility, which processes liquid waste to a granular form, continues to operate exceptionally well. The granular waste or calcine is stored in stainless steel bins and represents a very safe interim storage approach pending ultimate disposal of waste from that site in the early part of the twenty-first century.

With regard to the permanent disposal of defense high-level waste in a geologic repository, the Nuclear Waste Policy Act of 1982, Public Law 97-425, directed the President to evaluate by January 1985 the use of commercial waste disposal capacity for defense high-level waste. The Act requires the President to evaluate cost efficiency, health and safety, regulatory, transportation, public acceptability, and national security factors. Unless the evaluation concludes that national security and other considerations necessitate a dedicated defense waste repository, the Secretary of Energy is directed to proceed with arrangements for disposing of defense waste in the same repository used for commercial waste. Preparation of the study to support the evaluation is underway.

TRANSURANIC WASTE

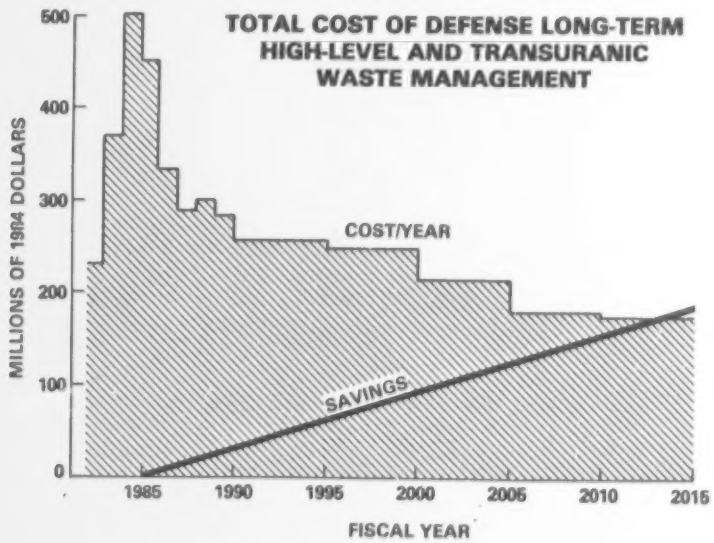
Transuranic waste is that waste that contains the long-lived radioactive elements beyond uranium in the periodic table. The principal element in such waste is plutonium. The objectives of our plan with regard to transuranic waste are to end interim storage and achieve permanent disposal. Newly generated and stored defense transuranic waste will be certified for compliance with waste acceptance criteria for the planned repository and sent to the Waste Isolation Pilot Plant in New Mexico after processing (if necessary) and environmental documentation. After 5 years of operational experience, a decision will be made to leave or retrieve the transuranic waste. Our schedule for permanent disposal of defense transuranic waste is shown on the chart.

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE TRANSURANIC WASTE



*THE NEPA PROCESS FOR SHIPMENT OF STORED INEL TRANSURANIC WASTE TO THE WIPP HAS BEEN COMPLETED.

We are on schedule with all activities shown on this chart. We expect to be certifying waste at all sites by the end of fiscal year 1984. Our pilot facilities at Idaho are continuing on schedule and within cost estimates. The construction of the Waste Isolation Pilot Plant is proceeding extremely well, and we now expect to complete this facility by December 1986, 1 year sooner than previously anticipated.



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COSTS

This next chart shows the estimated annual costs for disposing of defense high-level and transuranic wastes. The costs peak at about $450 million in the mid-1980's due to the construction costs for the Defense Waste Processing Facility and the Waste Isolation Pilot Plant (WIPP). These costs will be eventually offset by a reduction in the costs of safely maintaining the radioactive wastes in their current form. In addition, the immobilized waste, sealed deep in an underground repository at the end of this period, will present no hazard to man or his environment.

I will now describe some recent accomplishments, our plans for fiscal year 1985, and provide support for our request for fiscal year 1985 funding.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT
FY 1985 BUDGET REQUEST
(BA IN MILLIONS)

	FY 1984	FY 1985	
	APPROP.	AUTH.	APPROP.
INTERIM WASTE OPERATIONS	$314.0	$319.3	$329.0
LONG-TERM WASTE MANAGEMENT TECHNOLOGY (DEFENSE WASTE PROCESSING FACILITY)	211.3 (159.8)	334.2 (267.7)	334.2 (267.7)
TERMINAL STORAGE (WIPP)	137.7	87.1	87.5
BYPRODUCTS AND BENEFICIAL USE	15.6	0	0
PROGRAM DIRECTION	2.5	2.1	2.1
TOTAL	$681.1	$742.7	$752.8

INTERIM WASTE OPERATIONS

The principal objective of this program is the ongoing management of existing and newly generated waste from naval reactors and production operations, pending implementation of permanent disposal operations. During fiscal years 1984 and 1985, the transfer of high-level waste from old tanks to new tanks will continue at the Hanford Reservation. An additional 17 tanks will be isolated from the environment in fiscal year 1984 and 11 in fiscal year 1985 for a total of 74 out of 149. This program will be completed in fiscal year 1989 as scheduled.

The solidification and encapsulation of an additional 100 strontium capsules from high-level waste will be completed in fiscal year 1984, and we expect to complete encapsulation of the backlog of strontium by the third quarter of fiscal year 1985 (a total of 600 capsules planned) for safer storage and potential beneficial use. Encapsulation of the entire backlog of cesium (1,575 capsules) was completed in fiscal year 1983. Also at Hanford, construction of the eight double shell tanks (begun in 1983) will be completed 9 months ahead of schedule (first quarter of fiscal year 1986) assuring that adequate storage space is available for PUREX waste. Construction of the Waste Handling and Isolation Facility will continue which includes a portable grout facility to solidify low-level liquid waste for shallow land disposal thus saving tank space. The Savannah River waste transfer program is scheduled for completion in 1994. Waste in single shell tanks will be removed by the fourth quarter of fiscal year 1988. This reflects an optimum schedule interface between waste preparation in the tank farm and feed requirements for the Defense Waste Processing Facility (DWPF). In order to provide feed for DWPF operation, installation of sludge washing facilities will continue in 1985, and operation will begin in 1986. Installation of salt decontamination facilities will begin in 1985, and operation will begin in 1988. We will also initiate design and construction of a New Waste Transfer Facility in

fiscal year 1985 to continue safe H-Area tank farm operations and to interface with the DWPF.

WASTE VOLUME REDUCTION

Waste volume reduction is an important element of the Interim Waste Operations Program because it extends the lifetime of storage and disposal facilities and delays the need for new facilities. At Savannah River, for example, our goal for both fiscal year 1984 and 1985 is to gain 6 million gallons of high-level waste storage through our evaporative processes each year. This is the volume equivalent of about six new tanks. At Hanford we have accelerated evaporator operations to support PUREX reprocessing operations, which began earlier this year.

Solid waste volume reduction operations will continue to reduce the rate of expansion of new burial ground facilities at our sites. Segregation and examination of transuranic waste will reduce the amount which must be stored, certified, and eventually transported to and emplaced in the WIPP. The first quantities of waste were certified in early fiscal year 1983 for emplacement in WIPP.

Funds invested in development and demonstration of volume reduction and waste segregation techniques will result in decreased requirements for disposal and storage facilities and their related operating, closure, and long-term maintenance and surveillance costs. We will continue to study improved volume reduction technology to enhance efficiency of transportation and disposal.

During fiscal year 1985 we will continue to dispose of low-level waste and to retrievably store transuranic waste. We are continuing to develop and implement procedures to assure that newly generated transuranic waste is acceptable for emplacement in the WIPP. This certified waste is being stored separately.

The New Hydrofracture Facility at Oak Ridge was completed in fiscal year 1982 and began to inject a mixture of low-level waste and concrete into the shale formation under the site in June 1982. About 400,000 gallons of waste sludge from six old gunite tanks, whose construction dated back to the Manhattan Project, were disposed of in 1983 and 1984.

At the Idaho National Engineering Laboratory, the New Waste Calcining Facility (NWCF) began operations in September 1982. This facility converts liquid high-level waste into a granular solid, called "calcine," for interim storage in bins. The NWCF is a critical element of the fuel processing operation at Idaho, since there is no excess capacity for lag storage of liquid high-level waste. Since startup, this facility has solidified more than one million gallons of liquid. In fact, the NWCF has consistently operated at greater than design basis (sometimes as much as 50 percent greater than anticipated). The construction of the sixth set of storage bins for calcine will continue at Idaho with a scheduled completion in December 1984. Construction of the seventh set of bins will begin in March 1985 and be completed in June 1989. This will assure sufficient waste storage capacity is available to support production activities.

We are also investigating the feasibility of converting other waste inventories into beneficial byproducts. At Oak Ridge we are investigating the cost effectiveness of smelting about 80,000 tons of contaminated scrap metal into shielding blocks for use at several of the Department's high energy accelerator facilities. At Idaho we plan to demonstrate whether contaminated stainless steel can be smelted and fabricated into canisters for the immobilized high-level waste from the DWPF.

LANDLORD RESPONSIBILITIES

Under our landlord responsibilities, we will continue restoration of badly deteriorated general purpose support facilities and equipment to an acceptable standard of safety, reliability and efficiency. Our goal is to complete the "facilities restoration" part of our landlord responsibilities at Hanford in fiscal year 1988. The fiscal year 1985 Hanford landlord program includes the design and construction of a new central warehouse facility, since the old one is beyond economical repair.

At Idaho, maintenance, repair, and replacement continue for general purpose site support facilities, such as utilities, roads and service buildings; and site security systems continue. Landlord responsibilities at Idaho were assumed in fiscal year 1983. This landlord program will maintain the site fire and safety alarm systems. The Test Reactor Area (TRA) security system upgrade will start in fiscal year 1985 to meet the requirements of the TRA security plan which requires state-of-the-art detection and intrusion alarm systems.

DECONTAMINATION AND DECOMMISSIONING

We are reponsible for about 200 contaminated surplus defense facilities, including reactors, reprocessing plants, and waste management facilities. The facilities have been stabilized and are subjected to routine surveillance and maintenance. Our program emphasizes the safe management of these facilities, stressing beneficial reuse of structures, reduction of future maintenance costs, and recovery of valuable materials where cost effective. In fiscal year 1984 funds have been allocated to complete long-term plans and outyear cost estimates and to begin only priority projects. For fiscal year 1985 we will continue to provide surveillance and maintenance of all surplus defense facilities and continue high priority decommissioning work at Idaho, Mound Facility, Oak Ridge National Laboratory (ORNL), and Hanford with particular emphasis on facility reuse and cost effectiveness.

TRANSPORTATION OPERATIONS

We are also responsible for the Department-wide transportation operations and traffic management support programs to assure the safe, secure, efficient, and economic shipment of DOE materials in compliance with applicable Federal laws and regulations.

Major activities in fiscal year 1984 for Transportation Operations and Traffic Management include reducing rates on DOE shipments through volume discounts, data automation for more efficient utilization and management of resources, training and workshops for personnel involved in DOE shipment of hazardous materials; and activities to assure uniform DOE compliance with DOT and IAEA rules and regulations.

In fiscal year 1985 transportation management training will be expanded to include advanced training for traffic managers and DOE contractors. The packaging certification program will receive increased emphasis with documentation reviews to assure that the packagings for hazardous materials continue to meet current regulations. The negotiation with carriers will be expanded to assure even more efficient, economical movement of DOE shipments.

LONG-TERM WASTE MANAGEMENT TECHNOLOGY

This program addresses the long-term management and disposal of defense wastes. This program is consistent with the Defense Waste Management Plan for permanent disposal of defense high-level and transuranic waste the President submitted to you.

HIGH-LEVEL WASTE TECHNOLOGY

As I mentioned earlier, we are developing the technology for the long-term management of defense high-level waste at DOE sites with first emphasis on the DWPF at Savannah River. During fiscal year 1985 we will perform large-scale tests with simulated waste to optimize the design and demonstrate the reliability of the DWPF systems, including slurry feed, off-gas, salt disposal, and process controls. Smaller scale tests with actual high-level waste from the Savannah River Plant will continue in hot cells. Together, these tests will assure that the DWPF will work as designed. We will continue to describe and document the predicted behavior of the glass waste form in a geologic respository and make confirmatory tests. During fiscal year 1985 emphasis will shift toward planning, development, selection, and implementation of the long-term technology for high-level waste at Hanford.

DEFENSE WASTE PROCESSING FACILITY

The DWPF will immobilize defense high-level waste at Savannah River for storage, transportation, and disposal in a geologic repository. The sludge fraction of the high-level waste, which contains most of the hazardous radionuclides and virtually all of the long-lived activity, will be immobilized directly in borosilicate glass after extracting mercury. The activity in the soluble salt fraction of the waste, primarily radioactive cesium, will be separated by precipitation in the tank farm and can be used as a beneficial byproduct, possibly in an immobilized form. The decontaminated salt will be solidified and disposed of on the Savannah River site. When the DWPF is operational in fiscal year 1989, we will begin to work off the backlog of high-level waste from production operations at Savannah River, reaching a steady-state operation in about 15 years.

Construction of the DWPF began ahead of schedule in October 1983 and site grading, installation of temporary construction facilities, and equipment procurement

are underway. The design is almost 50 percent complete and on schedule. Design and construction will continue in fiscal year 1985, leading to "hot" operation in fiscal year 1989. We are requesting $238 million for the project in fiscal year 1985 which is our major program increase over fiscal year 1984. This funding is necessary to maintain the project schedule and stay within the total estimated cost. By the end of fiscal year 1985, the design will be about 80 percent complete. Construction of the main process buildings and support facilities will continue, and additional major procurements will be made for essential construction materials and equipment.

It is very important that our construction schedule be maintained. We have planned this project to be cost effective consistent with the Grace Commission's recommendations. Any delays will not only increase costs but will also cause significant operational problems at Savannah River. We are running out of tank space in which to store high-level waste, and we must continue to remove waste from the old tanks before problems develop. Major delays in DWPF could require the building of additional tanks and make the high-level waste cleanup job greater and more expensive.

The total estimated construction cost for the DWPF is $870 million and is based on a newly revised cost estimate. The amounts of escalation and contingency have been significantly reduced from the previous estimate of $910 million. Additional scope has also been added to the project that was originally planned for inclusion in a subsequent line item project (Stage 2). Technical improvements have eliminated the need for most of the Stage 2 requirements. The remaining items, which now make up about 10 percent of the DWPF project, are necessary to provide a complete facility to handle both sludge and salt waste. The cost estimate for this project has been reduced by about 70 percent from the original capital cost estimate of $2.8 billion (fiscal year 1979) through research and development and design optimization. We will continue to pursue opportunities to reduce its cost even further through effective project management by DOE staff and contractors during the construction phase.

TRANSURANIC WASTE TECHNOLOGY

This technology program focuses on supporting the WIPP. The first priority is to certify newly generated waste for the WIPP if it meets the acceptance criteria. This reduces the growth in the backlog of stored waste that requires examination before it can be sent to or processed for the WIPP. Second, the inventory of "old" stored waste will be examined and certified or processed consistent with the WIPP schedule.

In Idaho we have completed the final designs for two pilot plants in fiscal year 1983—the Stored Waste Examination Pilot Plant to examine and certify stored waste containers for the WIPP, and the Processing Experimental Pilot Plant to demonstrate processes for treating stored waste containers that do not meet the WIPP criteria. In fiscal year 1985 we are continuing construction on both pilot plants.

Other fiscal year 1985 activities include: (1) completing process engineering studies required to certify remote handled wastes and transfer of the technology to the sites; (2) installing and testing a drum counter at Richland; (3) begin certifying newly generated remote handled waste at ORNL; and (4) continuing technology development and transfer for reduced waste generation at all sites.

LOW-LEVEL WASTE TECHNOLOGY

The Low-Level Waste (LLW) Technology program supports waste operations at DOE sites. In fiscal year 1984 handbooks will document technologies for corrective measures for existing shallow land burial grounds, improved practices and procedures for operations for new shallow land burial grounds, and waste treatment options for use by generators and operators.

DOE has been developing an alternative to shallow land burial for potentially low-level waste. While these wastes fall within the definition of LLW, they may require greater isolation than that provided by shallow land burial due to their beta/gamma activity, heat, chemical toxicity, or if their physical size and shape would preclude WIPP waste acceptance certification. The Greater Confinement Disposal Test at the Nevada Test Site is evaluating a borehole concept (10 foot diameter, 120 feet deep) for special low-level waste. In fiscal year 1984 cesium and strontium capsules have been emplaced in the Greater Confinement Disposal Test. In fiscal year 1985 they will be monitored and predictive modeling will be developed.

AIRBORNE WASTE TECHNOLOGY

The Airborne Waste Technology program supports DOE operations in controlling and disposing gaseous and particulate effluents. In fiscal year 1984 this program will be completed with a topical report on real-time effluent monitoring systems and a final closeout report of efforts accomplished in the program since its inception. In fiscal year 1985 the orderly completion of a few program-related tasks will be performed under the low-level waste program.

TRANSPORTATION RESEARCH AND DEVELOPMENT

This program seeks to assure that safe, efficient, and reliable transportation will be available for defense nuclear wastes. Technology development, testing, and operational safety and accident analyses are conducted at the Transportation Technology Center at the Sandia National Laboratory in Albuquerque, New Mexico.

In fiscal year 1984 a prototype TRUPACT unit will be fabricated, and regulatory compliance testing will be performed. The high-level waste cask final design will be completed and a prototype cask fabricator selected. Major components of the first production unit of the new shipping package for cesium and strontium capsules will be delivered and made available for use. We will evaluate the impacts of regulatory changes; develop standards for packaging; and maintain data bases on shipments, incidents, routing, emergency response, and state and local legislation.

In fiscal year 1985 work will focus on research, development, and evaluation of nuclear materials transport systems to meet the Department's program requirements. This will include structural and thermal analysis and modeling, test environment characterization, testing facility development, transportation logistics and economic analysis on specific programs under development, analysis of State and local government transportation packaging legislation, analysis of IAEA Safety Series 6 impact on U.S. packaging, and accident assessment and risk analysis under various routing scenarios. The major effort in fiscal year 1985 will center on the development of high-level and remote handled transuranic waste transportation systems.

TERMINAL STORAGE—WASTE ISOLATION PILOT PLANT

The Waste Isolation Pilot Plant, now under development near Carlsbad, New Mexico, will provide a research and development facility to demonstrate the safe disposal of redioactive waste from national defense programs. WIPP is authorized by Public Law 96-164 and is exempt from licensing by the Nuclear Regulatory Commission.

The primary objectives of WIPP are to demonstrate, through a full-scale pilot plant, the technical and operationa methods for permanent isolation of defense-generated transuranic radioactive waste and to provide a facility for experiments on the behavior of high-level waste in bedded salt. The facility is designed to receive, inspect, emplace, and store defense waste. It will have the capability of disposing of defense transuranic waste and conducting experiments with defense-generated high-level wastes.

The construction of permanent surface and underground facilities started in July 1983 following an extensive exploratory program. This exploratory program included two large diameter shafts and mining over 2 miles of drifts (tunnels) to confirm the subsurface geology. Construction completion is scheduled for December 1986. A test and checkout period will follow with waste receiving operations targeted for October 1988.

Construction, which began in late-1983, will peak during fiscal year 1984 and fiscal year 1985. Enlarging the 6 foot diameter exploratory shaft to its final 19 foot diameter has started. Sinking the third shaft for facility ventilation has also started. Major contracts for constructing access roads, a rail spur, and a 31-mile water pipeline are in progress. The main waste handling building will be started in mid-1984.

With site characterization and site validation complete, Sandia research and development activities will emphasize in-situ experiments. These experiments and demonstration will establish the technical basis for defense waste disposal in bedded salt. This work will be based on an extensive background of predictive model development and laboratory/field testing. Specific technology experiments will include: Thermal/structural interaction, Operations demonstration, and Waste package performance.

The experiments will be conducted in areas already mined during the exploratory program and in areas now being mined.

Good relations with the State of New Mexico are important in continuing construction of WIPP. Issues of concern to the State are being actively negotiated within the framework of the Consultation and Cooperation Agreement.

One primary State concern is the mission of WIPP. Our mission is limited to the demonstration of transuranic waste disposal and experiments with defense high-level waste. We are committed to removing this high-level waste upon completion of the experiments or decommissioning of the facility. This mission is consistent with Public Law 96-164, its Conference Report (House Report 96-702), and subsequent budget authorization legislation. We want to reemphasize that the WIPP facility is not being designed for the permanent disposal of high-level waste, nor has the site been characterized for such permanent disposal. Our site characterization program was directed toward the statutory mission of demonstration of disposal of transuranic waste and the high-level waste experiments.

On February 10, 1984, the Secretary directed that negotiations with the State of New Mexico continue so that a timely agreement will be reached which defines the WIPP mission within the bounds described above. When that agreement is complete, its content will be included in testimony before the appropriate committees of Congress.

The Administration is supporting the WIPP Project with a request for $87.5 million. Fiscal year 1985 will be a peak year of construction at the WIPP site. The last of 3 shafts, a 6-mile rail spur, 15 miles of access roads, and a 31-mile water pipeline will be completed. The primary waste handling building, started in fiscal year 1984, will be under construction and completed in fiscal year 1986. Assuming project activities continue successfully, as they have in the past, WIPP will be ready to receive radioactive waste on schedule in October 1988.

BYPRODUCTS AND BENEFICIAL USE

The objective of the byproducts and beneficial use program is to identify and develop safe, beneficial, and cost-effective applications of radioisotopes and materials from the defense fuel cycle. Also included is the development of power, light, heat, and electrical sources that are long-lived, reliable, and secure for our national defense needs. DOE-funded projects will be completed or terminated with funding from prior years. Specifically, the prior year funds for completion of the City of Albuquerque irradiator project will be made available to the City of Albuquerque. DOE commitments to provide continuing assistance to the City of Albuquerque will be reassessed. The operation of the transportable irradiator will be turned over to users, such as the U.S. Department of Agriculture, or terminated. Research using the Sandia irradiator and studies involving New Mexico State University will be completed and final reports issued. The shipping cask developed to economically transport cesium and strontium capsules from storage at Hanford will be available for lease. Pork and fruit pilot plant irradiators will be completed with prior year funds and turned over to users for pilot operation.

With regard to prototype power generators using the defense waste byproduct, strontium-90, fabrication of a high power 500 watt radioisotope thermoelectric generator (RTG) will be completed in fiscal year 1984. In fiscal year 1985 the RTG will be fueled and turned over to DOD for demonstration such as in the emergency shelter of the unmanned short-range radar station of the North Warning System. In fiscal year 1984 tritium infrared assault landing lights were successfully used by the Joint Special Forces in the invasion of Grenada, and test and eveluation by the Alaskan Air Command established acceptable pilot runway light acquisition at distances of greater than 6 miles for C-130, A-10, and KC-135 aircraft. In fiscal year 1985 previous developmental work in radioluminescent lighting will be brought to conclusion, and future efforts turned over to the DOD, CIA, FAA, and the States of Alaska, Virginia, and Washington.

This completes my presentation. I shall be happy to answer questions.

Mr. MORGAN. Mr. Chairman, I would like to turn the discussion over to Dr. Wagner, and I will later resume my discussion of the program.

STATEMENT OF RICHARD L. WAGNER, JR., ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

Dr. WAGNER. Mr. Chairman, I have a statement that I also would like to submit for the record, if I may.

Senator WARNER. Without objection, it will be accepted.

[Dr. Wagner's statement appears on p. 86.]

Dr. WAGNER. I will summarize it in a few minutes.

INTRODUCTION

Last year on this occasion I made three points about the value of this program to the Department of Defense. Those points were that the weapon systems of which the warheads are an important and integral part are sorely needed to maintain the level of deterrence that we require.

The second point was that the advanced development for those warheads is paying off rather handsomely in features in the warheads, safety and military effectiveness features, that really add to the deterrence quite substantially.

The third point was that the high level of technology exemplified by this program, the laboratories, and the production complex, even if not manifested directly in weapons themselves, is of substantial deterrent value in keeping the Soviets in a deterred frame of mind simply through the quality of the technology.

I believe that those points are still valid, and I would like to develop them in slightly different ways this year.

[Chart deleted.]

My first Vu-Graph summarizes the points that in considering the requests that the Department of Defense makes of the Department of Energy for warhead production, [deleted] I will amplify on that as on the other points.

The second point is that while what is most evident in the program is the warheads themselves, the DOE technology base strengthens the deterrence that we exhibit to the Soviets in many other ways. [Deleted.]

WEAPON REQUIREMENTS

With regard to our production requests, as you know, we submit them to the President jointly with the Secretary of Energy in the nuclear weapons stockpile memorandum. The President then approves them, and that memorandum is the basis for future production.

In developing our requests in that memorandum during the last year, we had taken into account the extensive workload in the Department of Energy and have tried [deleted] among other things, some of the things that are listed on this next chart.

[Chart deleted.]

[Deleted.]

With regard to the specific systems themselves, you will hear a rather substantial discussion in General Hoover's testimony a little later, and the need for the systems is perhaps somewhat better addressed in regard to the Department of Defense budget request.

I am prepared to discuss any system in response to questions, if you would like. But I will simply say that we are proceeding with the modernization program that has been part of this administration's defense program for some years, with one exception.

W82 155-MILLIMETER WARHEAD

Last year, in something of an eleventh hour move, funding was deleted for the W82 155-millimeter warhead from the Defense Department budget. The lead in that action was taken by Senator Nunn, who did it on a couple of grounds, as we understand it. One is a question as to whether the full cost for that production was required. The second was because he felt, I believe, that the Department of Defense at that time was not stepping up as fully as we should to the need for modernization of our conventional deterrent forces, especially in Europe. And, as he said it later, I think he wanted to get our attention. Well, he got our attention.

Senator WARNER. The Senator is present and can speak for himself at any time.

Dr. WAGNER. I'm sorry, Senator Nunn. I did not see you come in.

Senator NUNN. You did a better job than I would have.

Dr. WAGNER. Let me say that I am a bit embarrassed at not seeing you, Senator. You do know that we value your support and judgment on these matters.

We feel a bit chagrined at this difficulty with regard to the W82. We are currently—in response both to Senator Nunn's request and a request in the DOD authorization bill to prepare reports on five items; but two in particular here, the modernization plans for the conventional systems and our plans for the future and rationale for the theater nuclear forces—preparing reports along those lines to be submitted to the Congress in, I believe it is May, though perhaps it is late April.

We are seriously considering coming back and asking for a reconsideration of the situation on the W82, on a couple of grounds. One is that we believe we understand better how it fits into the conventional modernization program. We will probably come in with a request [deleted].

As I say, we are still in the process of considering exactly what the details of this proposal for reconsideration will be.

THE ROLE OF THE 155-MILLIMETER AFAP

Let me give you a brief bit of rationale as to how we see these kinds of warheads and the 155 millimeter W82 in particular fitting into the overall deterrence equation in Europe.

The purpose of these warheads, the short-range warheads, is principally to force the Soviet conventional attacks to be dispersed so that they can be better handled by the upgraded conventional munitions, the overall upgrade of the conventional forces.

The Soviets already have shown that they take the capabilities of the short-range systems seriously into account because for years they have had a doctrine of dispersing their forces, both in depth and in width. We call it their echelonment posture. It is a central feature of their conventional attack doctrine. We believe that in substantial measure, it has been forced by the presence of the battlefield nuclear weapons.

Let me show you what it might mean.

SOVIET BATTLEFIELD TACTICS

[Chart deleted.]

Dr. WAGNER. This is a cartoon drawn from a battlefield simulation of a Soviet tank battalion. The tanks are represented by the small dots [indicating], facing or attacking in a concentrated breakthrough mode NATO defenses here [indicating], tanks and antitank weapons, with the force ratio at about a 3 or 4 to 1 level, favoring the offense here [indicating].

[Deleted.]

It is in response, we believe, to that kind of situation that the Soviets have instituted a doctrine of dispersing their attacks, and if dispersed, so that it would require three weapons to do even not quite the same amount of damage.

The ratio of weight of attack to weight of defense is closer to 1 on 1 and fairly detailed battlefield simulations show that in that case the defense wins.

So, it is largely to force this kind of dispersal and, therefore, a reduction of the effectiveness of a conventional attack, that we believe the battlefield weapons, and, in particular, the 155, is useful.

Senator WARNER. That is on the assumption that they would not retaliate with a similar weapon and, thereby, make the defense a more dispersed pattern.

Dr. WAGNER. I believe, Senator Warner, that the Soviets would much prefer to see a conventional attack go through to completion without having to resort on either side to the use of nuclear weapons. I think they must understand what we believe to be the case, which is that nuclear weapons actually used on the battlefield probably would just bring everything to a grinding halt, even, in fact, if they were to respond to a NATO first use. I believe the last thing they want to see is this carefully honed armored attack simply be brought to a halt.

So, I think that what we have here is a deterrent capability—not really so much a warfighting capability, but a deterrent capability, which deters not so much the nuclear response but deters the conventional attack to begin with.

Senator LEVIN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator LEVIN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator LEVIN. Why would they just go vertically? Instead of going backward, why wouldn't they go up and down and cover more territory?

Dr. WAGNER. You mean laterally, like that [indicating]?

Senator LEVIN. Yes.

Dr. WAGNER. They might do that as well. But, in any case, the force ratio against the defender and the defender is spread out. I have just shown a section of the battlefield between these two lines [indicating].

Senator LEVIN. Do our battle simulation plans lead to the same result, that the defense would win if they moved laterally, instead of in echelons like that?

Dr. WAGNER. Yes, they do, because they can present these forces rather quickly in that direction (indicating).

Senator NUNN. Is it really fair to say that "we win" that kind of scenario, or is it fair to say that we do better because they don't mass? I have never seen us " win" over there in any kind of war.

Dr. WAGNER. In this particular limited kind of scenario, you actually win if you can reduce the force ratios in the way that is shown by this kind of dispersal.

In fact, if you take a much larger view and look not at battalions, but at divisions, corps, and armies, in fact, what you do is you delay.

Senator NUNN. You are talking about a first echelon comparison only?

Dr. WAGNER. This is a first echelon battalion. There may be a second and follow-on echelon battalions coming on later.

So, yes, we do not portray this as a win technique. We do portray it as a way of raising the price and reducing the expectation of success in the Soviet calculation of the way the conventional force would operate.

Let me come to Senator Levin's point now.

W82 EFFECTIVENESS

[Deleted.]

Those are some of the arguments that we are working together into this paper, which we will come back to the Senate with in April or May.

Senator LEVIN. Mr. Chairman, before we leave this subject [deleted].

Dr. WAGNER. [Deleted.]

Senator LEVIN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator LEVIN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator LEVIN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator WARNER. [Deleted.]

Dr. WAGNER. [Deleted.] They have three types of cannon artillery: a 203 mm; a 240 mm mortar; and a 152 mm, slightly smaller than the Howitzers we are talking about here.

They have the tubes in large numbers, and we believe have a very large and growing capability in terms of the warheads.

In addition to the cannon artillery, they have a much more extensive, both in terms of total numbers and numbers of types, capability for battlefield missile systems—frogs, free rockets, and so forth.

So, we are faced with a rather large array of battlefield nuclear systems on the part of the Soviets.

ROLE OF TECHNOLOGY BASE ACTIVITIES

DOE TECHNOLOGY BASE CONTRIBUTES TO THE BROADER "NUCLEAR DETERRENCE INFRASTRUCTURE"

- NUCLEAR WEAPONS EFFECTS AND SURVIVABILITY
- NUCLEAR WEAPON *SYSTEM* DESIGN
- ANTI-TERRORIST SECURITY
- REACTORS FOR SPACE AND MILITARY BASE POWER
- DELETED
- DELETED

If I could turn to this second point, and I will try to go a little faster, the technology base strengthens deterrence in a lot of ways besides just the weapons that go into the stockpile. When we have gotten to the point of rough parity in terms of numbers of nuclear weapons, both on the strategic side and on the theater side, a lot of deterrence revolves around what I might call the professionalism in the way you portray yourself as able to use the weapons.

Much of that has to do with an understanding of weapons effects, how the nuclear systems relate to the conventional systems, and a number of other things. I have listed some of them on this chart.

In DOD we get a lot of help from DOE on all of these kinds of things.

Working through the questions of nuclear weapons effects and survivability, ranging all the way from understanding the kinds of battlefield effects that I have just described, to survivability for ICBM's, bomber basing, the DOE laboratories maintain a small, but high quality, technology base in all of those sorts of things.

They were extremely helpful to us in the unfortunate situation a year ago with regard to MX basing. It is not so much the outcome of that as it is the very useful DOE contributions that were made to those debates within the Department of Defense.

On the second point there, nuclear weapon system design, the DOE maintains groups, all of the laboratories maintain groups, that work very closely with the Department of Defense, not just to talk about what the warheads should be, but what should the systems be.

An example that comes immediately to mind is with regard to the modernization of fleet defensive weapons, ASW and antiair weapons, where Sandia and Los Alamos, in particular, have in some ways guided the Navy through the systems analyses that we needed to understand how to use those kinds of weapons.

NUCLEAR WEAPONS SECURITY

On the third bullet, we have a long-term and quite extensive program to upgrade the security of the nuclear weapons storage arrangements that we have, particularly in Europe.

A lot of the impetus for that program was provided by Sandia Laboratories.

A lot of the fixes that we are putting into place were invented by Sandia. [Deleted.]

We simply could not have done without and could not do without that kind of support.

SPACE AND MILITARY BASE POWER

Reactors for space and military base power, a neglected technology for a number of years, is something we are beginning to look at more seriously. In fact, it is the DOE laboratories that have maintained the technology base for small, special purpose reactors for military use.

[Deleted.] That is an absolutely indispensible kind of work, and it is just the last of this set of examples of ways in which the real business of providing deterrence beyond just the hardware, is enhanced by the DOE technology base.

We simply could not do without the contributions that base makes to our overall deterrent posture. That is true not only in the nuclear area, but it is increasingly true in the nonnuclear area.

UPGRADE OF CONVENTIONAL FORCES

DOE TECHNOLOGY BASE CONTRIBUTES TO DOD'S NON-NUCLEAR CAPABILITY AS WELL

SOME EXAMPLES:

- NON-NUCLEAR ADVANCED MUNITIONS
- NON-NUCLEAR DIRECTED ENERGY WEAPONS
- ARMOR
- BATTLEFIELD SENSORS
- SUBMARINE QUIETING AND HYDRODYNAMIC EFFICIENCY
- ASW SIGNAL PROCESSING
- CHEMICAL WARFARE DEFENSE

This chart gives some examples of ways in which the DOE laboratories are helping us with upgrading the conventional forces.

The first point, nonnuclear advanced munitions. The DOE labs probably know better than anyone in the country how to push metal with explosives, so to speak. That is at the heart for munitions for smart and brilliant conventional systems. The warheads have to be matched to the systems. We could not do without that sort of contribution.

In the DOD budget this year, we have provided $10 million for the DOE laboratories in what we hope will be a level of effort basis, to allow them to just nurture their technology base to help us do this conventional upgrade.

The third point is with regard to armor, which is part of the conventional munitions upgrade. There is a kind of defense/offense race that goes on all the time there, and the DOE labs have helped us with armor design as well.

In this important area [indicating], battlefield nonnuclear directed energy weapons, the DOE labs have some work going on.

Submarine quieting and the hydrodynamic efficiency of submarines is a small, but extremely important, program.

Next is ASW signal processing.

Last, but far from least, is the whole, very difficult, area of defense against chemical warfare.

Some of the technologies that the DOE labs have put together over the last 12 years or so are extremely pertinent.

The particular projects of these kinds that are carried out, are almost always done with DOD funding. But there would not be anything for DOD to fund if the DOE had not developed the technology base in all of those areas over the years.

So, we absolutely have to have that technology base for those reasons as well.

[Deleted.]

I will simply list them, and then we will discuss the first one in a bit of detail.

One of the things that has been inherent in the nuclear weapons program since 1942 or so has been the idea of understanding what potential adversaries could do.

During World War II, the potential adversaries were the Germans and the Japanese. The question was what could they do with their technology and could we beat them to an atomic bomb.

Modeling what the Soviets might do with thermonuclear weapons was an important consideration in the programs at Los Alamos in the late 1940's, and it has continued to be a theme of the research and development, especially the exploratory research and development ever since.

We are today right in the middle of another such process and are trying to understand what potential adversaries could do with advanced nuclear weapons design, which may be as important as the hydrogen bomb question. That has to do with whether or not it is possible, and, therefore, whether or not the Soviets could build what some of us call third generation nuclear weapons.

THIRD GENERATION NUCLEAR WEAPONS

Let me define what I believe those terms mean.

There have been three rather distinct [deleted] generations of nuclear explosives.

The first was up through about 1955, all fission explosives. The second was the hydrogen bombs, extending through the present. The third was these weapons [indicating], where we have attempted to reduce collateral damage by tailoring the radiation outputs in a few systems—[deleted].

One characteristic of the first two generations was that the weapons produced indiscriminately blast and heat and a tremendous amount of unwanted damage. That is what has given nuclear weapons the horrifying aura that they have.

They have that aura justly, because they are horrifying weapons. [Deleted.]

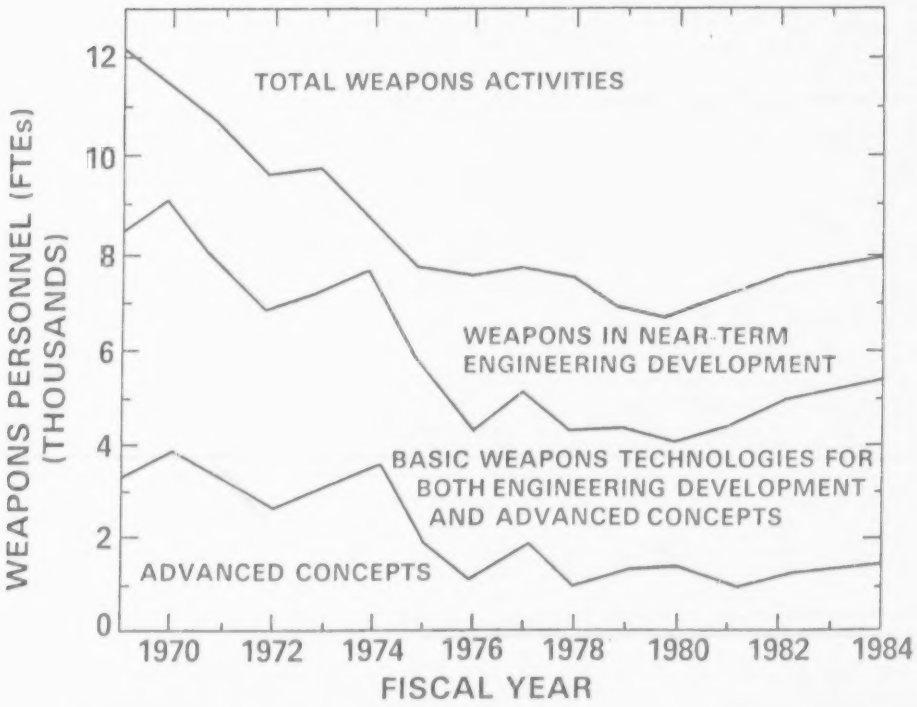
Of at least equal importance, though, is our need to understand the whole range of possibilities, to see what the Soviets could do in this area, because in some ways these kinds of technologies [indicating] seem more suited to the Soviet mindset about the use of nuclear weapons than they do to our own.

The Soviets, we have known rather well now for a decade, think a lot in terms of what we, in an over-simplified way, call war-fighting. We have come to understand that in order to deter them, we must exhibit some capability to use nuclear weapons in an operational sense ourselves.

These sorts of weapons seem ideally suited [indicating] because of their selectivity and discrimination to the kind of war-fighting mentality that we believe the Soviets have.

[Deleted.]

R&D ACTIVITY



As you know, during the decade of the 1970's, the research and development activity in the DOE declined in terms of total full-time equivalent personnel according to the chart shown there [indicating]. There has been some rebuilding of that R&D personnel base in the last few years, but it is still substantially below the levels of the late 1960's and early 1970's, and, in particular, in this area of advanced technology, this bottom line [indicating] shows roughly a factor of two decrease from that earlier period. It is exactly this which has to be exploited and raised, we believe. There are plans to raise it in 1985 to a higher level so as to avoid that kind of technology surprise.

[Deleted.]

I hope that I have portrayed for you a situation where DOE contributions are seen by us to be extremely important, not only in the weapons themselves, but in the other kinds of infrastructure and technology base [deleted].

I would be happy to take your questions, Mr. Chairman.

[The prepared statement of Hon. Richard L. Wagner, Jr., follows:]

PREPARED STATEMENT BY HON. RICHARD L. WAGNER, JR., CHAIRMAN, MILITARY LIAISON COMMITTEE (MLC) TO THE DEPARTMENT OF ENERGY AND ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY) ON NUCLEAR WEAPONS PROGRAMS

Mr. Chairman and members of the committee, it is my pleasure to appear before you again this year to discuss the Department of Defense's nuclear weapons program requirements and long-term objectives. With the support of this committee and the Congress, we have made significant progress in modernizing our nuclear deterrent forces since I appeared before you a year ago, but there is much more remaining to be done. The requirements for modern nuclear systems, both strategic and non-strategic, have not diminished because the world we live in today is still a dangerous one. Our sincere efforts to reach agreements with the Soviets on arms reductions have not yet been successful, but we are convinced that success in these negotiations depends on Soviet perceptions of our willingness to retain an adequate deterrent balance. Only then will they return to the negotiating table and join with us in seeking real, balanced, and verifiable reductions in nuclear forces.

On this same occasion last year, my statement was directed to three major points:

(1) That the DOD weapon systems, and their associated DOE-produced warheads, are sorely needed;

(2) That advanced warhead development is paying off in improved features for deployed warheads; and

(3) DOE advanced technology, in and of itself, contributes to keeping the Soviets in a "deterred frame of mind."

These points are, of course, still valid now, a year later; and for the central theme of my discussion of the DOE weapons program this year I'd like to come at them from some different directions, and add some additional perspective. I'll summarize briefly, and then return to discuss each point in turn. There are four points:

First, the requests by the Department of Defense of the DOE for weapon production are consistent in detail with the system developments requested in the DOD budget. There are no extras, because of this, the justifications of the warhead developments, in terms of contribution to deterrence, are best discussed in the context of the systems in the DOD budget, and I will only briefly mention those systems here this year. For those systems, in making warhead development and production requests, we in DOD recognize that DOE resources and capacity are quite limited, and we do as much as we can to reduce the production demands. Nevertheless, the demand is substantial and will stress the DOE capabilities.

Second, the DOE technology base, and in particular the weapon labs' technology base, nourishes the overall national defense infrastructure in many important but often not very visible ways. There is much more to the overall deterrent provided by those weapon systems than just the hardware itself, and the labs make important contributions beyond warhead design. This is true in non-nuclear defense technology as well as in nuclear technology. Because of these broad contributions, it is doubly important that the technology base—facilities, equipment, people, basic research, and exploratory development—be brought up to date and kept there. [Deleted.]

Because of all these factors, cuts in the DOE defense programs budget would hurt badly this year.

Let me now give you some specifics on those four points.

REQUIREMENTS RELATED DIRECTLY TO DOD PROGRAM

Historically, since the early days of the Atomic Energy Commission (AEC), our national policy has been to maintain a separation between the developer/producer of nuclear weapons and the military forces who can be called on to employ them. In the early days this separation was much more distinct than it is today, and included complete AEC custody of all weapons until late in 1956 when the military was made responsible for control of some weapons. In 1959 the DOD was given responsibility for custody of all operationally deployed nuclear weapons, and we retain that responsibility today, though DOD and DOE still work closely on safety and security of weapons from design, through deployment and stockpile improvements, until final retirement.

In the early days, when the technology of nuclear weapon design was developing rapidly, the weapon designer determined to a very great extent the limits of capability that could be provided to the military. By the 1960's, as weapon design technology matured, military requirements had a greater influence on weapon characteristics. For nearly thirty-nine years the military liaison committee has served to coordinate the needs of the military services with the capabilities of the AEC, then ERDA, and now the DOE defense programs. I believe this cooperative process has served the Nation well and will continue to serve well in the future.

CHART 1.—DEVELOPMENT AND PRODUCTION OF NUCLEAR WEAPONS ARE COMPLEMENTARY RESPONSIBILITIES OF DOE AND DOD

Determination of military characteristics is a primary function of DOD.

Development and production of nuclear systems are primary functions of DOE: producing nuclear materials; developing, testing, producing, and assuring reliability of nuclear weapons.

Division of responsibilities, exclusive of "nuclear" systems, is by joint agreement.

DOD and DOE are jointly responsible for preparing the nuclear weapons stockpile memorandum for presidential approval.

Both DOD and DOE are responsible for fostering the technology base: conducting research, investigating new and innovative concepts.

DOD and DOE share the responsibility to: identify and resolve health and safety problems connected with nuclear weapons, prevent unauthorized use of nuclear weapons, coordinate efforts to improve the effectiveness of physical security measures.

As shown on chart 1, the DOD and DOE have complementing responsibilities for development and production of nuclear weapons. In January 1983 we updated our working arrangements by formalizing a new memorandum of understanding, and we have been active over the past year in updating the detailed processes by which we jointly manage and conduct the research, development, testing, production and other aspects of these complex programs. We have also recently established new agreements between DOD, DOE, and Justice on the response to terrorist threats, and also between DOD, DOE, and NASA on developing nuclear power for use in space.

We have also worked together to make better use of our limited resources by expanding our joint efforts in non-nuclear and non-weapons areas where the unique capabilities of the national laboratories can contribute more fully to the nation's defense needs. In the future we believe there will be greater opportunities for more joint programs, especially in areas where technologies are similar.

How then are these deterrent requirements connected to activities in the Department of Energy for warhead development, production, and maintenance? And how can we judge the research and development activity that is needed?

The process begins by the operational commanders assessing their needs to conduct the operations assigned them with reasonable assurance and minimal risk. These operationally required forces are then evaluated in light of fiscal and policy guidance issued by the Secretary of Defense. The results of this evaluation are reported by the JCS in their joint program assessment memorandum. The forces needed are included in the DOD five year defense plan (FYDP), and the programs and funding are thoroughly reviewed during the DOD budget hearings in the Congress.

Within DOD, the nuclear weapons required to support approved FYDP forces are then calculated and reflected in the nuclear weapons stockpile memorandum (NWSM) which is developed jointly with DOE and submitted to the President for approval. The production requirements placed upon the DOE represent nuclear weapons which are required to support approved weapons systems which the services are in the process of procuring. Although there are some changes in our projections for specific systems from year to year as we refine our estimates of future needs and react to fact-of-life changes in direction, the aggregrate projections over the past several years have been very accurate. Over the FYDP period especially, DOE has a solid basis for planning, and the out-years are now more realistic than ever.

The specific DOD programs which form the basis of our requests of DOE are, of course, the result of the interaction between the Department of Defense and the Congress which results in authorized and funded DOD programs. Specific justification of these programs is most properly discussed in connection with the DOD Budget. Let me briefly summarize them here.

Over the past three years the Congress has approved the Major elements of the President's program to modernize all three legs of the strategic nuclear triad, and to improve our nonstrategic nuclear deterrent. The Department of Energy has engaged in a truly cooperative spirit with the DOD to acquire and field these systems and the warheads that arm them. As you know, the ALCM is being deployed with our B-52 forces; the B-1B will be fully capable of carrying our newest weapons which will give added strength and flexibility to our bomber force; the Peacekeeper with its new warhead will begin deployment in late 1986; and the new Trident II SLBM with a new warhead is under development. We have begun deployment of GLCM and Pershing II as agreed with our NATO allies. The new 8-inch W79 AFAP is

being produced and stored in the United States. We are confident that it can be deployed to support theater forces if needed. Any future deployments will occur only after consultation with the allied nations involved. These new systems increase the credibility and capability of our deterrent posture—and all of these systems depend on the warheads produced by DOE.

Last year the Congress directed that we terminate the W82 155-mm development program. We are now engaged in activity which is consistent with that guidance. Indeed, you will find no DOE request for W82 funds in the fiscal year 1985 budget. On the DOD side, we have asked for a modest amount to allow completion of a limited technical data package. This will enable us to reach a logical termination point that provides for an orderly consolidation of the considerable technological advances made thus far. Moreover, because of the deficiencies in NATO's TNF and the urgent need for modernization, we intend to ask you to reconsider the production issue in the context of the report on NATO's TNF which was required in the fiscal year 1984 Authorization Act. That report is being prepared now and will be provided to you soon. We believe the W82 is needed as a deterrent to the large Soviet capability we face. In order to understand this, I will describe briefly how short range nuclear systems contribute to deterrence.

Short range nuclear weapons serve two major kinds of deterrence functions:

One is a broad, theoretical, and political one, where the short range weapons are part of a continuum of capabilities that contribute to escalation control, linkage to the strategic deterrent, and a general sense of strength that enhances resolve. Short range weapons have advantages and liabilities in this context—advantages in filling what would otherwise be a functional gap in the deterrence continuum, (especially in light of an on-going Soviet build-up of battlefield nuclear weapons) and political liabilities in NATO in that they bring to mind "warfighting."

The other deterrence function short range nuclear weapons perform is to deter by influencing the Soviets' estimate of the outcome of the actual battle. This role should be taken very seriously, because the Soviets may well weigh all the sophisticated factors making up deterrence theory, [deleted].

Nuclear artillery is particularly hard for them to destroy for several reasons. Artillery is dual capable, which means the nuclear is virtually indistinguishable from the conventional capability. We have thousands of cannons, the cannons are widely dispersed and camouflaged, and are very mobile. The 155-mm shell is especially important-because most of NATO's cannons are of that size. [Deleted.]

We also know, even if battlefield weapons are not used, the threat of their use forces the Soviets to fight in a "nuclear scared" or dispersed posture, which makes their conventional operations less effective. This dispersal is one aspect of their echelonment posture. In the absence of short range weapons, it would be easier for them to mass forces forward for breakthrough. Thus the presence of battlefield nuclear weapons goes hand-in-hand with our developing posture of deep attacks against echeloned forces.

Beyond these arguments about their survivability and forcing dispersal on the Soviets, there is a high probability that actual use of nuclear weapons on the battlefield would simply bring everything to a halt. There would be fires, tree blowdown, fallout, contaminated equipment and areas, psychological and other effects that can't be quantified or analyzed. The Soviets appear to know this, and spend effort to try to counter it. But one must suspect that the last thing they want is to see the attack just stop.

[Deleted.]

The total systems cost of nuclear artillery is low compared to other nuclear weapons systems, because the cannons and personnel already exist. All that is needed are the shells.

Because of its greatly improved military effectiveness, the W82 will significantly enhance our theater deterrence by substantially reducing the Soviet's estimate of success in a major ground offensive.

We are improving our deterrence posture with deployment of the GLCM and the Pershing II, and the new W79 does add some capability, but we believe the W82 is needed also.

As we field the modern theater and strategic systems, simultaneously the DOE is working along with DOD to retire our older weapons from the stockpile. This allows us to recover and reuse valuable nuclear materials and reduces the stockpiling of obsolete weapons, but it imposes an additional workload on the production complex that must be considered. The retirement of an old weapon involves nearly as much work as building a new one. Additionally, we are modifying selected weapons now in the stockpile to extend their utility and to add improved safety and security fea-

tures. This reduces the need to build new weapons and saves resources, but it does impose some added workload on DOE.

Unfortunately, but necessarily, support of the expanded production workload has not allowed the needed facilities improvements and expansion of R&D efforts to proceed as rapidly as we would like. Maintaining a healthy infrastructure will be vital to our continued success in the years ahead.

Our longer range planning is obviously less exact; the estimated requirements are based upon the services' extended planning annex, joint staff inputs, and weapon systems concepts currently in research and development. In addition, we take into account lead times needed for facilities, plant equipment, R&D, and testing within DOE to avoid prematurely foreclosing a capability which requires long lead time. In our long-range requirements we consider possible arms control agreements, but we also develop planning which preserves this Nation's capability so that we are not dependent on achieving any specific agreement.

Much has been made recently of the size of the U.S. weapon stockpile, which has been declining both in yield and number. [Deleted.] as shown in chart 2.

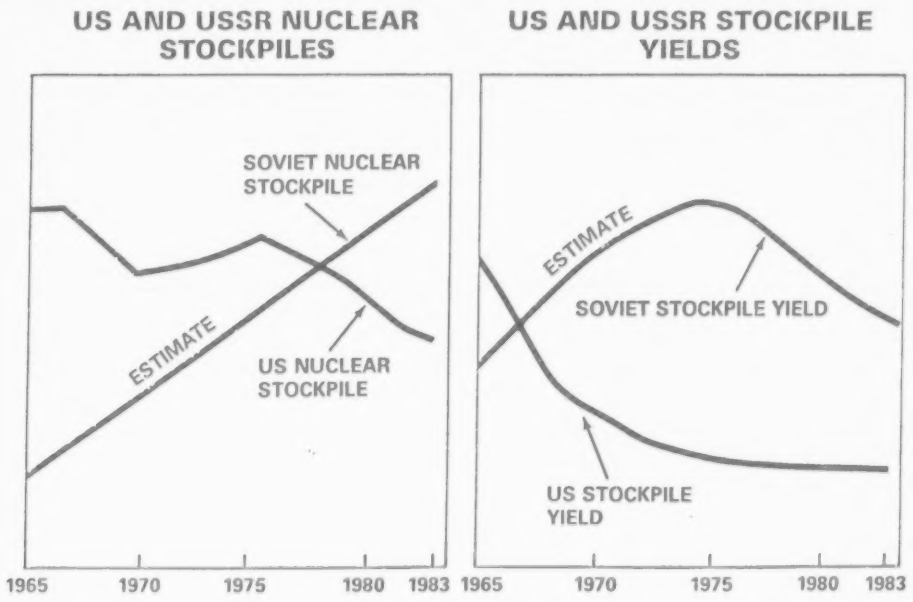


CHART 2

Despite this, we do not attempt to match our estimates of the Soviet nuclear weapons stockpile weapon for weapon or system by system. Instead, we consider the deterrent capability needed, the contribution of our nuclear weapons systems in providing both strategic and nonstrategic deterrence, and the deployment necessary to support our military forces with the necessary flexibility.

Let me put our requests for substantial weapon production during the next few years into perspective in light of the President's desires for, and work toward, arms reductions. It is certainly true that if the Soviets agree to deep cuts, some systems would be curtailed, with corresponding reduction in warhead builds. However, set against this are two other factors. First, in a number of cases the reductions would come from old systems, with production still needed for the new one, since what we are about is a modernization because of the age of our weapons. (And remember that accelerated retirements also pose a substantial workload on DOE.) Second, planning for the levels of production that we are forecasting constitutes, in reality, a hedge against delays or failure in the Soviets' agreeing to reductions. Indeed, we would not want to hold out the prospect to the Soviets that, by simply waiting us out, they could achieve one-sided reductions in the U.S. because we had prematurely reduced our future planning levels. In terms of number of warheads, the threat is not so much the current imbalance, as it is the Soviet capacity to build many more

warheads, continuing at their recent high rate. They clearly have this capacity, as evidenced by the rapid buildup in the last decade. They have no incentives to discontinue use of this capacity, which they have already bought and paid for, unless we can show the capacity to match them if need be. This is why planning for increases is so important—not because we want them, but to give the Soviets incentive to stop their buildup.

To improve our longer range planning, we have increased the interaction between the DOD and DOE during formulation of the nuclear weapon development guidance (NWDG). The NWDG is the long-range planning document that presents DOD-wide nuclear weapon development requirements and technology goals to the DOE. The document formulation process was revised in May 1982 to encourage greater user/developer interaction. A major element in the NWDG process is the use of technical assistance teams composed of DOD, DOE, and Defense Nuclear Agency (DNA) research personnel participating in workshops and discussions with nuclear capable unified and specified commands and other selected service activities. For the fiscal year 1983 NWDG 11 workshops were held. The technology objectives identified in the fiscal year 1983 NWDG centered on [deleted].

[Deleted.] The new NWDG formulation process will be conducted on a biennial basis in the future. Our intent is to improve the marriage between the technology "push" and the "pull" from military requirements.

Another example of increased cooperation between the DOD and DOE, as it relates to the stockpile and its future, is in the area of stockpile confidence tests. As the name suggests these are underground nuclear tests that complement our quality assurance program in confirming the reliability of our nuclear stockpile. An interagency planning committee works jointly to identify candidate warheads. Chart 5 [chart deleted] shows the stockpile confidence tests since 1970. [Deleted.]

Planning for each annual nuclear test program is coordinated jointly. [Deleted.] Additionally, we are now working much more actively to take advantage of operational test and evaluation activities by adding research and reliability experiments where this can be done with minimum interference. The DOD and DOE also jointly develop plans for post-development non-nuclear testing of nuclear weapon subsystems. The plans describe the testing that provides an objective basis for assessing nuclear weapon subsystem reliability throughout the post-development life-cycle. These plans are an important management tool because they provide a clear understanding of the separate and joint responsibilities for test, evaluation, and reporting for each weapon program, while avoiding unwarranted duplications in the test program.

In planning for the future the military services are now much more aware of the limited, finite resources available within DOE defense programs. As a result, the Military Liaison Committee (MLC) pays a lot of attention to ensuring that the weapon and related requirements which we transmit to DOE are realistic, necessary, and devoid of "gold plating". As a matter of course all resource related requirements for the DOE must be forwarded through the MLC. We give each careful attention to reduce the impact on DOE programs. Specific areas which are considered include: [deleted]. Some of the ways we have scrutinized requirements are shown in chart 6, [chart deleted] and described in the following:

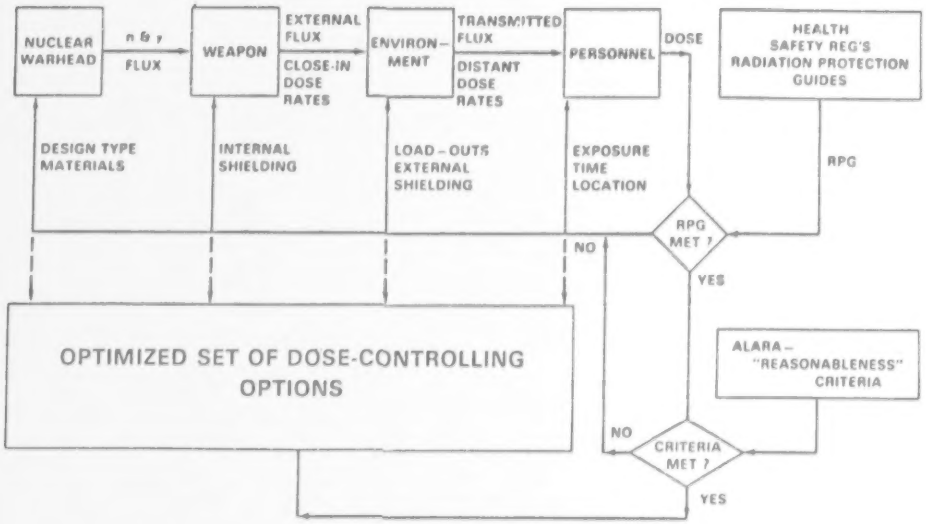
As an example of the detail in which we review nuclear weapon requirements, let me review for you our considerations related to intrinsic radiation requirements, which can have a substantial impact on both DOD nuclear weapon operations and DOE weapon design. In July 1980, the Military Liaison Committee (MLC) was tasked to act as a Committee on Nuclear Weapon Intrinsic Radiation (INRAD), to explore current work in this area, look for neglected areas of importance, and recommend any actions needed to assure a safe, well-documented approach to nuclear weapon operations with respect to intrinsic radiation in the future. A working group comprised of representatives from OSD, DNA, the services, the Joint Staff, and DOE participated in the study.

The recommendations, approved by the MLC last year, primarily involved: Implementation of a recently issued DOD instruction, "Occupational Radiation Protection Program;" incorporation of a total systems approach in the determination of INRAD military characteristics at the outset of the nuclear weapon system design process; and establishment of a follow-on group to maintain continuing attention in this area.

We have established a total system approach in determining INRAD military characteristics, because this requirement can substantially impact the warhead design, including the need for additional underground nuclear tests, and add complexities (and therefore additional costs) to subsequent production. This is an excellent example of actions we in the DOD are taking to conserve scarce DOE resources.

Each project officers group forms a subcommittee, with both service and DOE representatives, to investigate, evaluate, and resolve INRAD issues for military characteristics.

INTRINSIC RADIATION TRADE-OFF MODEL



As shown in chart 7, the INRAD exposure to personnel is estimated by considering their location and exposure times, and by considering shielding naturally provided by the weapon system and environment. Many options exist to reduce the already quite low exposures. Warhead design might be modified to reduce INRAD, but shielding both within the weapons system and in the environment, such as aboard ships, might be added. Administrative controls might also be implemented to minimize the presence of personnel in specified areas. Cost and effectiveness of all such options are considered during the development of new warheads. [Deleted.]

These examples illustrate the partnership necessary in the joint DOD/DOE nuclear weapons program to meet the substantial requirements that now exist. On our side we have increased our sensitivity to the impacts of our requirements on the DOE, and the DOE continues to advise us of those impacts. Certainly we can and will do even more to reduce the stresses on DOE of keeping options open over extended periods. The success of the nuclear weapons program has been, and will continue to be, dependent on cooperation by both partners in these areas of joint responsibility.

The fiscal year 1984-1989 nuclear weapon stockpile memorandum has been approved by the President. [Deleted.]

The DOD requirements for nuclear weapons from the DOE, in [deleted] aggregate, represent an ordered, well-reasoned modernization of our nuclear forces and are by no means unprecedented in terms of stockpile size, production rates, or retirement rates [deleted.] Planning for, and providing the materials to meet, our nuclear weapons needs is a complex process. [Deleted.]

DOE AS PART OF THE OVERALL NATIONAL DEFENSE TECHNOLOGY BASE

The technology base resident in the DOE Laboratories contributes to our national defense in many ways besides nuclear weapon design and support for warhead production. The Department of Energy Laboratories are a unique source and pool of the Nation's technical expertise, which supports the overall national defense infrastructure in important but often not very visible ways. They have the world's most sophisticated computers and a tremendous pool of highly trained and motivated

people. This national resource should be used in the broadest ways we can manage, not exclusively nuclear oriented. Closer interactions with the DOD can draw the theoretical knowledge from the laboratories to many practical applications. Expansion into non-nuclear ordnance and energy related projects are examples. Expansion of formal and informal interchanges are being encouraged to make fullest use of our joint resources.

There's more to nuclear deterrence than just having the weapons, especially when both sides have about the same numbers. The Soviets think about nuclear weapons in terms of warfighting—how the weapons would actually be used—and to deter them we must demonstrate competence in military use—effective targeting and operations with nuclear weapons, safety, security, survivability, weapons effects, long-term endurance. All these are needed to demonstrate that we could actually use the weapons if we had to, and are thus required for a robust deterrent posture. Much of it comes down to having people in the military who are trained and competent in these areas.

The Atomic Energy Act, by removing from DOD the responsibility for warhead design and production, has removed from DOD one of the focal points around which what I might call "broad deterrent competence" might be built. This was perhaps intended by the framers of the Atomic Energy Act, though I believe more important to them was denying custody of nuclear weapons to the military—a circumstance long since changed. (It is somewhat ironic that the situation in the Soviet Union appears to be reversed).

Make no mistake—the DOD, from top to bottom, takes nuclear weapons and deterrence seriously, and there are very competent people involved, but we are handicapped by this separation from the research on weapons in fully building the requisite infrastructure. The Defense Nuclear Agency (DNA) fills the gap to some extent, but much of DNA's base was created out of the AEC labs and continues to be nourished by them.

My point is that DOE is required to help compensate for this truncation of DOD's nuclear infrastructure, and that this is an important, though not very visible, contribution. Let me give you some examples.

1. Weapons effects—understanding them is extremely important for designing systems, ensuring survivability. The Nation is handicapped by the requirement to test underground, so those tests must be very elaborate, environments must be simulated by specially designed nuclear devices, and much must be done with elaborate calculations. A little over a decade ago, the AEC labs had several hundred people doing this kind of work, and most of the difficult problems in weapons effects were identified by the AEC labs. These people provided a base from which the DOD competence in this area was nourished, often by good people leaving the labs and going to work for the DOD contractor community. Today this base at the labs is only about a tenth what it was a decade or so ago. Much of the slack has been picked up by DNA and the service labs, but what remains in DOE is extremely important. One example is the use, by DNA, of the Los Alamos computation base for DNA calculations.

2. Nuclear weapon systems design, as distinct from warhead design, and especially determination of warhead requirements and how the warhead interacts with the system. Of course much of this is done by the DOD, but the labs play an important role. Recent examples are the labs' contributions to MX basing considerations, modernization of fleet weapons, and simulations of theater weapons operations and engagements.

3. Nuclear weapon security. DOD is responsible for this area, and a fully fleshed-out operational system exists. But in the aftermath of the Munich Olympics and during the rise of international terrorism, when it was clear that we needed to improve our security posture, Sandia in particular took the initiative in identifying useful improvements. They continue to help us in many essential ways, and are a continuing and vital presence on the ground in the European theater especially.

4. Military applications of nuclear reactor systems. The nuclear navy has, of course, maintained the highest standards of competence, but those reactor applications have become quite narrowly applied to ship propulsion needs. The civil nuclear community, quite frankly, appears to lack the vitality to explore innovative military reactor applications. These applications may be very important in two areas—space nuclear power and secure, enduring power for military bases. The labs have maintained an interest in these areas which DOD is now beginning to draw on after decades of little effort.

There are many other examples of how the labs nourish, support, and constructively criticize the DOD nuclear weapons infrastructure. [Deleted.]

What I have been talking about so far is the way in which the DOE technology base contributes to the larger national nuclear deterrence infrastructure. But the

labs' technology base, maintained for nuclear weapon R&D, also contributes importantly and increasingly to the non-nuclear defense posture of the Nation. This Vu-Graph gives examples of this kind of work. Let me talk a little more about one area—non-nuclear munitions.

DOE TECHNOLOGY BASE CONTRIBUTES TO DOD'S NON-NUCLEAR CAPABILITY AS WELL

SOME EXAMPLES:

- NON-NUCLEAR ADVANCED MUNITIONS
- NON-NUCLEAR DIRECTED ENERGY WEAPONS
- ARMOR
- BATTLEFIELD SENSORS
- SUBMARINE QUIETING AND HYDRODYNAMIC EFFICIENCY
- ASW SIGNAL PROCESSING
- CHEMICAL WARFARE DEFENSE

Of course this non-nuclear work is done on a reimbursable basis, with funding provided by DOD, but the basic capability is there because of the facilities and skills maintained by the nuclear weapon and other DOE-supported programs. If this base declines, or fails to be modernized, the non-nuclear defense posture of the Nation will also eventually be the poorer for it. This chart shows one aspect of the status of that base—that is, the people involved in building and maintaining it.

Finally, let me observe that one very important product of the DOE tech base is experienced, quality people, trained at the DOE weapons labs, who have left the labs to take positions of responsibility in DOD and other parts of the defense community. This contribution ranges from the very high levels—including one Secretary of Defense, three Secretaries of the Air Force, four directors of defense research and engineering, at least one service Chief of Staff, and several people at the Assistant Secretary or equivalent levels in Defense—to further down in the DOD infrastructure where people such as the hundreds of officers who have served at the labs as military research associates bring their experience to bear in creating a more effective nuclear deterrent posture. This is just one more extremely valuable product of the Laboratories' technology base, and one which will also decline if the Labs' tech base declines, since the quality of the facilities and equipment, in the long run, is what attracts good people to the program.

It is hard to quantify these kinds of contributions to defense. A guess on my part is that some 15 percent to 20 percent of the labs effort goes to these areas, which are less obvious than the actual warheads designed for production, but are also very important. As you know, and as this chart (RD manpower) shows, the tech base effort declined during the 1970's, and we are still, to a greater extent than is prudent, living off technological capital built up before that decline. The following discusses these items in more detail.

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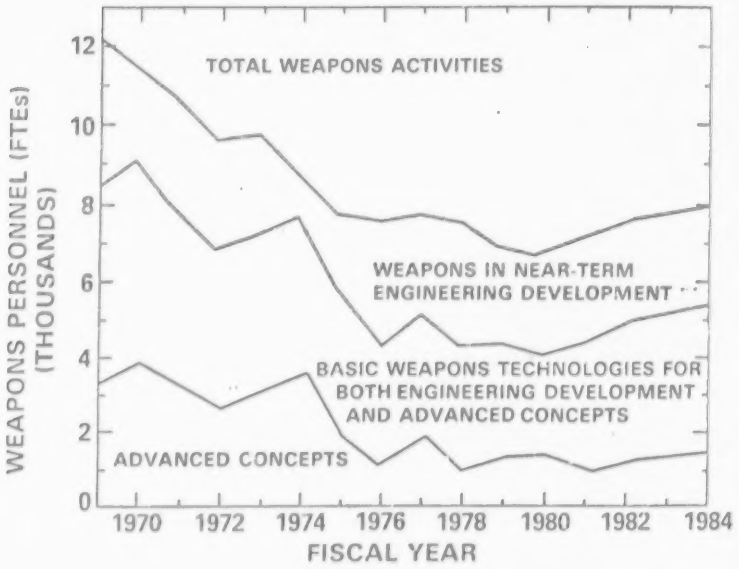
R&D ACTIVITY



This Nation's ability to influence world affairs is affected by the extent to which the United States maintains technological supremacy in the defense area. As you are aware, the national laboratories have assembled a massive and broad technological base in pursuit of their nuclear weapons R&D mission and much of this base is broadly applicable to non-nuclear military technology. These laboratories with their immense technical and computational capabilities represent a national resource that should not be limited to nuclear weapons programs. Just as these laboratories were created to develop a radically different weapon based on new science and new technology, they should now be tasked to pursue advanced weapon concepts of all types applicable to our projected critical military needs. The resources and people to support these R&D programs have improved slightly, but we believe much more needs to be done.

Level of effort funding, which has worked so well for nuclear R&D is essential so that an efficient and stable research base can be maintained and the workload perturbations and uncertainties of contractual arrangements can be avoided. We are working with DOE to encourage some of the world's foremost scientists at the labs by providing broader opportunity to explore long-term research for new technologies with a wide variety of applications. As a first step toward this end, in the area of non-nuclear munitions, the DOD has set aside $10 million in fiscal year 1985 for research on non-nuclear munitions technology, and we anticipate that the DOE will request similar funding for this activity in future budgets. Our interest in expanding the R&D areas of the national laboratories in no way modifies their national security mission of nuclear weapons R&D. It will take greater advantage of their existing capabilities. The skills and knowledge acquired through research on nuclear weapons can be exploited to advance the technology of non-nuclear alternatives, and we are asking that Congress work with us to accomplish this goal.

Of foremost importance among the various elements of our nuclear cooperation with our allies is the subject of safety and security of nuclear weapons [deleted].

There are many other areas of interaction. For example, analyses by the Laboratories of weapon output and effects provided the foundation for systems vulnerability and survivability work now conducted by Defense Nuclear Agency. Recently, the DOE labs have conducted special analytical studies that assisted DOD in system definition and other major decisions on the SM-2(N), battlefield weapons, and MX

basing options. The expertise at the labs is used in many other ways, including nuclear intelligence assessment.

Over the years, DOE has provided people of broad experience and unique technical background to fill technical and management positions in the DOD, other government, and defense contractor areas. In a somewhat narrower source, personnel exchanges are an excellent way to bridge the technical expert-user gap. These exchanges should be formalized and more effectively used by both DOE and DOD, and we are working hard on improving these personnel exchanges. We have found over the years that the military officers who spend a tour at the laboratories find the experience they gain to be very beneficial later in other assignments. Similarly, the three DOE personnel on my staff, one at DNA, and others find the experience very beneficial.

In the fall of 1982, DNA and DOE entered into an agreement whereby Los Alamos National Laboratory (LANL) provides computational resources to the roughly 140 contractor organization located throughout the country supporting the DNA RDT&E mission.

This support began in January last year, and is working very well, access to computer resources at the LANL central computing facility (CCF) are provided through an existing telecommunications network managed by DNA. This computational support included making available half of a Cray, an archival file system, and extensive printer and graphics resources. LANL also agreed to integrate DNA's Cyber 176 computer into their facility and manage its operations. LANL assumes the technical and operational responsibility for CCF resources made available to the DNA research community and provides technical planning and diagnostic support for the DNA communications network. DNA retains responsibility for identifying, specifying, and analyzing requirements and then manages the computational resources in accordance with agency priorities.

This arrangement between DNA and DOE has given the DNA scientific community access to superb computational facilities—second to none in the world—and it has done so at substantially lower cost than would otherwise have been possible.

Other areas of mutual cooperation and teamwork between DOD and DOE are too numerous to discuss in any great detail, but these include our joint efforts to protect classified information, to control the export of our defense related high technology, to assist with non-proliferation activities, to verify compliance (or non-compliance) with existing treaties, and to assist in formulating U.S. positions in the arms reduction negotiations.

ADVANCED TECHNOLOGY AND SOVIET CAPABILITY

Since the early days of WWII, the work of the nuclear weapons program has been driven, in large degree, by uncertainties in what adversaries could do. The Manhattan Project was undertaken partly out of concern for German progress in nuclear physics. In the years after 1945, the hydrogen bomb decision was influenced by estimates of Soviet progress, or lack of it, toward that capability. We are, today, in the middle of the same kind of situation.

As you may know, the DOD has published and distributed two versions of "Soviet Military Power," which was first published in 1981 and up-dated in 1983, to provide the public with information about the scope and nature of the Soviet threat that we confront. The Armed Services Committee has also been provided a comprehensive briefing on the continuing growth of Soviet military capabilities.

Of all the threats to our ability to encourage a peaceful world, none surpasses that posed by the Soviet nuclear arsenal. Since the first Soviet nuclear explosion on August 19, 1949, that threat has continued to grow larger with each passing year. Its growth pattern has been constant and unaffected by Soviet economic difficulties, our effort toward rapprochement, successes or failures in the arms control arena, or even international crises. The growth seems to move with a vitality and life of its own.

[Deleted.]

As you know, President Reagan has directed that a comprehensive and intensive effort be initiated "to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles."

[Deleted.]

The SDI is a research program designed to provide options in the strategic defense arena. In recognition of the importance of the SDI, it will be centrally managed within DOD, with direct responsibility to the Secretary of Defense. Although

funded separately, we believe the Department of Energy (DOE) program is integral to the overall SDI program [deleted].

[Deleted.] A memorandum of understanding, signed by the Secretaries of Defense and Energy to establish the relationship between the overall DOD strategic defense initiative management responsibilities and the SDI research and technology development activities executed by the Department of Energy is in preparation.

[Deleted.]

RESOURCE LEVERAGE IN DOE NUCLEAR WEAPON PROGRAM

[Deleted.] Also, although the great majority of the cost of a weapons system is borne by the DOD, the support provided by the DOE is essential. Seemingly small decrements in the DOE budget [deleted] can have significant impact on the more costly DOD programs. Let me give some examples, first in the area of weapon production. Funding for direct warhead production has high leverage. Because of the stringent requirements for safety and reliability, there is inherently a large buy-in price in production. Once this buy-in price is payed, actual direct weapon production is not as expensive as it might appear on the surface. By the same token, small reductions in funding for production can result in disproportionately large reductions in weapons produced. [Deleted.]

[Deleted.] While it is harder to quantify, this same kind of leverage clearly operates in the area of research and development "product".

Congressional funding constraints such as those imposed on the Peacekeeper W87 warhead funding have greatly complicated our planning for warhead production, particularly in view of the simultaneous modernization requirements for our strategic and theater nuclear forces. Construction funds in both fiscal year 1983 and 1984 were fenced. The lack of timely release of funds causes a progressively riskier position in trying to meet IOC commitments, to have warheads available when the missile is ready for deployment. Other defense nuclear programs can suffer as an unavoidable result. Because of the nature of nuclear weapon production, construction funds are necessary very early for DOE to support DOD requirements. When the Congress reduces DOE production funding and applies restrictive language on construction funds, this can constrain or delay DOD systems which have already been approved and funded. The result is reduced efficiency in the acquisition process and increased costs in both Departments.

[Deleted.]

In many such cases, small dollar investments can provide high dividends, not only in terms of DOD programs but the total cost of DOE programs. In simple terms, we must patch the chuck-holes in the road and fix the water pipes or the structure will not continue indefinitely carrying the load we now require. [Deleted.]

SIS can play a significant role in the future production of SNM. [Deleted.]

SUMMARY

By way of summary, I would like to try to place the challenge before us today in context with similar decisions that the Nation's leadership faced in the past. Faced with the stresses of a world war, President Roosevelt reacted promptly and with high priority to Einstein's letter suggesting that development of an atomic bomb should be possible. We have all heard stories about the difficulties and successes of the Manhattan District Project conducted by General Groves and of the driving genius and philosophical stresses of the scientists who designed and built the first crude bombs. We know also that the German nuclear scientists were not far behind us in this research.

Ultimately, President Truman made the hard decision necessary to save many thousands of American lives which otherwise would have been lost in a protracted invasion of Japan. But perhaps the most lasting benefit to the world of President Truman's decision is the impression it has left with all of us that a nuclear war cannot be won and must never be fought.

President Reagan has stated this often, and I am sure we all strongly support this view. How then did we arrive at a condition where we must have nuclear weapons to deter their use? In a more perfect world we would eliminate all these weapons immediately.

After World War II, when the U.S. had the only existing atomic weapons, to preclude development by other nations we were prepared to place these weapons under the control of a world body. The Soviets effectively prevented this arrangement from succeeding, and we have had to manage in a world of confrontation ever since. We proceeded in stages from an overwhelming nuclear advantage, which allowed us to maintain a strategic deterrent posture characterized as "massive retaliation," to

a period of approximate equivalence of strategic forces—but there is continuing Soviet growth. Today we have a national strategy that we describe as "flexible response." Our deterrence policy and the strategy that implements it requires a complete spectrum of military capabilities and high confidence in our control procedures, but it still depends primarily on offensive weapon systems for a deterrent balance.

President Reagan has asked that the Nation's scientific community once again lead the way to a better defense, and we are working to begin that process even though it will probably take us many years of sustained and innovative technological development. I believe we can be successful if we can muster the collective commitment the effort will require.

I believe this because the weapons of war, and nuclear weapons in particular, come in both evolutionary and revolutionary steps. We have witnessed the first two major revolutions in nuclear weapon capabilities, and we are now seeing the first indications that a third generation is possible. There have also been continuing evolutionary improvements.

This new generation of weapon concepts places a very great responsibility on those of us who manage the programs and also on those in the Congress who reflect and to a great extent influence the national will. The judgments which we must make are perhaps larger than the decision to move from the first to the second generation of nuclear weapons.

I believe that we must proceed with this research, and with high priority. When a technology begins to mature, we do not yet know of a way to keep it from our potential enemies. The Soviets have repeatedly demonstrated their willingness to press every advantage we allow them. Conversely, if we are successful in directing this technology toward truly defensive initiatives we can progressively become less dependent on offensive systems for our defense. This can lead to a safer and more stable world.

CONCLUSION

In conclusion, I hope I have demonstrated for you that the DOE Weapons Program is a national resource whose contributions to the national security are broader and more diverse than just the weapons that are produced, and that this resource is operating close to margin of effectiveness. What is to be done with this resource is truly a question of national strategy. In large measure, the U.S. depends on advanced technology for deterrence and how we nurture and deploy, so to speak, that technology is indeed a national strategy question. In the short term, it is not as momentous a question as some that make the headlines. However, in the long term, it may be more important to our national security, considering the leverage which this technology can have and the risks associated with allowing us to be surprised.

Although this program has been subject to annual review in the administration and the Congress [deleted] I urge you, Mr. Chairman and members of the Committee, to view the programs you will hear described during the next several hours of testimony in this light—that they are matters of long term, national security strategy having to do with a major national resource.

The basic strategy issue involved here could have two outcomes. You could keep the program going just enough to get by, perhaps even satisfying most of the DOD's immediate, identified needs, perhaps gaining slightly on the burdens imposed on the program because of environmental and safeguards concerns, perhaps even doing some high quality exploratory development in a few carefully selected areas (or what may be more likely, doing a marginal job over a larger range of areas because we do not know what the potential adversary is doing and we must be able to cover all the bases to some extent).

The other alternative is to take steps to begin a true revitalization of this program so that there will be no question that it is second to none; so that we will not be surprised by Soviet developments whose nature we might not even understand when we see them because we have not done the work ourselves; and so that the future applications of these incredible sources of energy will be used for deterrence in the causes we all support.

Thank you, Mr. Chairman.

Senator WARNER. Let me discuss this with my colleagues.

Do you gentlemen wish to have an opportunity now for a few questions?

INTRINSIC RADIATION

Senator EXON. Yes. I have just one question.

I appreciated the detailed briefing very much.

Earlier, you were talking about the danger of radiation, [deleted]. You must have done a lot of research in your work on that over the years. Is there more that needs to be done in that particular area?

Dr. WAGNER. I think the research base is as complete as it can be. We know how to assess the problem. The Navy, in particular, has had a very comprehensive program [deleted].

The average per capita radiation dose has come down by a factor of three, four, or five in the last decade because of that program. [Deleted.]

Senator EXON. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator EXON. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator EXON. Well, again, I just think if you need money for those kinds of things—well, let me say this. As a layman, I do not quite understand this completely. Is there much more danger to Navy personnel from radiation from a warhead than from a reactor?

Dr. WAGNER. No, sir. In fact, total exposures to the sailors is well below the small fraction of the normal average dose from background radiation in the environment, such as cosmic rays or the bricks in the house, whatever.

There is a principle in this area called as low as reasonably achievable.

Senator EXON. And you think that we are at that point?

Dr. WAGNER. I think we are continuing to drive down in that way. You just have to keep pushing on it. [Deleted.]

Senator EXON. I assume there is no difference in dangers of radiation from the weapons we now have on board the submarines, and when we decide to go with the Stealth. Would the Stealth technology make any difference with regard to radiation? Would it be one and the same?

Dr. WAGNER. It really does not. There is almost no connection between the two.

Senator EXON. Thank you, Mr. Chairman.

Senator WARNER. I think at this point the record ought to reflect and be supplemented on the point, if necessary, that to the best of my knowledge, the Navy has no recorded incident of a single individual suffering any long-term effects from service aboard ship or ashore.

Dr. WAGNER. That is correct, sir.

Senator WARNER. That speaks quite well for the safety issue.

Senator Nunn.

DETERMINING THE SIZE OF THE NUCLEAR WEAPONS STOCKPILE

Senator NUNN. Thank you, Mr. Chairman.

I have just a couple of questions at this point.

Dr. Wagner, when you calculate the number of nuclear warheads you are going to be producing, how do you go about that? I will take as an example the B–61 tactical bomb. [Deleted.]

Who makes that decision and what is the basis of it?

Dr. WAGNER. It is made, like a lot of different decisions, by a number of people. My office works those numbers and looks to the services for the rationale behind those numbers.

Senator NUNN. Do they make the request to begin with?

Dr. WAGNER. They make the request to begin with. We scrub the numbers and in some cases adjust them in either direction.

Senator NUNN. Who would have made the request on the B–61, [deleted].

Dr. WAGNER. The Air Force particularly, based on inputs from TAC and from USAFE, in Europe, generally.

Senator NUNN. [Deleted.]

This means that we are [deleted]. That is contrary to anything we have experienced before. [Deleted.]

Dr. WAGNER. Those costs are already essentially incremental costs, and perhaps you should get a more detailed answer from the DOE people. [Deleted.]

Let me address the two principal points you have brought up, [deleted].

Senator NUNN. How about just the cost? Why would the per unit cost [deleted].

Dr. WAGNER. Largely because we have now put into place a policy where all weapons in the future—and there may be one or two exceptions, but in this particular case—[deleted].

Senator NUNN. That was not in the figures last year, but it is in there this year?

Dr. WAGNER. [Deleted.]

Senator NUNN. Could you or DOE furnish for the record, whoever is appropriate, the basic breakdown as to why those per unit costs [deleted].

Mr. MORGAN. Yes, sir. We will be happy to do that.

[The information is retained in committee files.]

Senator NUNN. Is there any other reason [deleted].

Dr. WAGNER. That is the only one that I can think of. There may be others.

[Deleted.] But I think we should get those numbers for you.

Senator NUNN. Also, I would like for you to address for the record several other cases. First the ALCM. [Deleted.]

There is a very, very large per unit [deleted] cost. Now, if they are [deleted] that kind of thing, that is understandable. But I thought those [deleted] last year's budgets, too.

Dr. WAGNER. In those three cases, [deleted] so it must be something else, and we will provide that for the record.

[The information is retained in committee files.]

Senator EXON. Would you yield for a moment?

Senator NUNN. Yes.

Senator EXON. Is it possible that we are running into another situation here where the costs [deleted] in the initial instance?

Dr. WAGNER. I perhaps should turn that over to the DOE people.

Mr. MORGAN. Let me say that we will provide that for the record.

[Deleted.] I will have to look at each one incrementally, and provide that information for the record, if I may.

[The information is retained in Committee files.]

Senator NUNN. Do you have any tentative idea why the [deleted] has been so much?

Mr. MORGAN. [Deleted] so I will have to provide that for you.

Senator NUNN. Well, maybe they are not right and maybe I am wrong.

Does it sound like the numbers may not be right?

Dr. WAGNER. There has been something of a change in the last few years in the way the accounting is done in taking into account longer service life. I don't know whether that applies here, but I know that it has applied in some other systems.

Senator NUNN. If you could furnish that for the record, it would be appreciated.

[The information is retained in committee files.]

PERSHING–II PRODUCTION LEVELS

Senator NUNN. I have just one other question at this time, Mr. Chairman.

I notice that [deleted] Pershing II warheads are what are being built. Is that the production run that you envision?

General HOOVER. Sir, that is the projected total build right now, which is laid on as a requirement to the Department of Energy. We have not built that number yet, and we will be building a certain number of those each year.

Senator NUNN. [Deleted.]

General HOOVER. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. How many Pershing II's are you asking for this year in this year's budget?

Mr. MORGAN. [Deleted.]

Senator NUNN. How many have you built so far?

Mr. MORGAN. [Deleted.]

Senator NUNN. Well, it looks to me that [deleted] you have to decide something pretty quickly here, [deleted].

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

Mr. MORGAN. [Deleted.]

Senator NUNN. [Deleted.]

Mr. MORGAN. At the end of fiscal year 1985, yes, sir.

Senator NUNN. [Deleted.]

Dr. WAGNER. [Deleted.]

Senator NUNN. [Deleted.]

[The information is retained in Committee files.]

Senator NUNN. That is all I have, Mr. Chairman. Thank you.

Senator WARNER. Thank you, Senator Nunn.

Senator EXON. Mr. Chairman.
Senator WARNER. Senator Exon?
Senator EXON. I have one more quick question, Mr. Chairman.

MX WARHEAD STATUS

Would you summarize briefly for us how far you are into the MX warheads, as of now?
General HOOVER. Yes, sir.
We are in the engineering and development phase on the MX warhead. We have done all of the necessary underground testing to support that warhead. We have about another $20.9 million in construction requirements in the fiscal year 1985 budget, which will complete the total of about $125 million worth of construction effort. So, we have another $20.9 million to go on that. We are on a very challenging schedule. But we are prepared to support the initial operational deployment [deleted] in December 1986.
[Deleted.]
Senator EXON. Am I right in assuming that there is a relationship, at least in research and development and testing, with the proposed Midgetman warhead? How far are you into the Midgetman?
General HOOVER. The current baseline warhead being considered for the Midgetman is essentially the same warhead technology that has been developed for the MX, or Peacekeeper, warhead.
Senator EXON. So, if I understand the answer to my question, the warhead availability for both the MX and the Midgetman would be at about the same time?
General HOOVER. In terms of warhead technology, yield, and compatibility with the weapon system as we now understand it, yes, sir.
Senator EXON. Thank you.

6-MONTH TEST MORATORIUM

Senator WARNER. Gentlemen, would each of you touch for a moment on the effect that a congressionally imposed Test Ban Treaty would have for a period of, say, 6 months. Just give us the highlights and then supplement some of the specifics for the record. Assume that the test ban went into effect on January 1, 1985, for 6 months.
Dr. WAGNER. Senator Warner, I think the effect would be very serious, both in terms of delays during the 6 months and also because my skepticism makes me wonder whether or not it would set a pattern for a much longer moratorium.
The DOE people should address the impact on the warhead development. But, let me simply say that the Department of Defense carries out a couple of nuclear tests a year for understanding weapons effects, ICBM basing, and the hardening of reentry vehicles. [Deleted.]
Senator WARNER. You will please supplement that for the record.
I think there would be a considerable dollar loss, would there not?
Dr. WAGNER. Yes, there would be.

Senator WARNER. Putting aside all of the ideological reasons for doing it, there is a practical effect in terms of dollars and cents that would be irretriveably lost, would there not?

Dr. WAGNER. Yes, there would.

You would have to keep the personnel in place, but they would be doing essentially nothing.

Senator WARNER. That's right.

General Hoover, did you have a comment?

General HOOVER. I would say that that summarizes fundamentally the problem in the Department of Energy. [Deleted.]

Senator WARNER. Mr. Morgan, did you wish to respond in addition?

Mr. MORGAN. I would like to provide a response for the record, if I may.

Senator WARNER. Thank you.

We would appreciate that.

[The information follows:]

The following information is provided to supplement the testimony of Dr. Wagner and General Hoover with respect to the impact of a congressionally imposed moratorium on testing.

The administration has set forth, and is fully supportive of, viable nuclear arms control initiatives. These initiatives are aimed at enhancing the security of the United States. A moratorium would not serve that purpose and would likely aggravate the current numerical superiority of Soviet strategic forces.

Our last experience with a testing moratorium was from 1958 to 1961. The hope that the moratorium would lead to serious negotiations by the Soviet Union on a comprehensive test ban was frustrated by the lack of apparent Soviet interest and led finally to President Eisenhower declaring that we would no longer be bound by the moratorium. However, testing did not resume until the Soviets began a sudden and massive program, which gave them a significant advantage in the development of nuclear weapons. President Kennedy said at that time that the United States should never again offer an uninspected moratorium.

There would be less impact, of course, from a 6-month moratorium, especially if it was anticipated and planned for. However, it would be unverified and would undoubtedly generate pressures for continuance. It is not realistic to expect that it could be replaced with a verified Comprehensive Test Ban Treaty during the 6-month period, even if a treaty were deemed to be in the best interests of the United States. Verification has been a major problem in Threshold Test Ban Treaty discussions, and there has been no indication to date of Soviet flexibility on this issue.

However, we must consider the very real possibility that a "6-month moratorium" could be followed by an extension with the hope for a Comprehensive Test Ban. Looking at that possibility, though we continue to be committed to a Comprehensive Test Ban as a long-term goal, I do not believe that a Comprehensive Test Ban in the near term would enhance the security of the United States. First, it would halt our modernization program, which is a response to the massive buildup carried out by the Soviet Union over the past decade in the face of the United States restraint. This would preclude replacing existing warheads with models incorporating improved safety, security, and command and control features. Secondly, it is inconsistent with efforts to move toward more stabilizing weapons. This is understood to be the goal of the Scowcroft Commission in recommending the development of a small intercontinental ballistic missile to complement the Peacekeeper Weapon System force. Thirdly, and related to the second point, it would halt research on defensive weapons which may make possible a future shift away from the Deterrent Offensive Force Balance approach to national security.

The immediate effect of a 6-month moratorium would be to delay all tests for a 6-month period, though some reordering of tests might lessen the impact on priority programs. It should be understood, however, that during the 6-month period it would be necessary to maintain the test site in an operational state. Some acceleration of testing after moratorium might be possible, but it would probably not be possible to recapture all lost time due to equipment and other limitations. [Deleted.] The long-term impact of a moratorium followed by a resumption in testing would depend greatly on its duration and on perceptions in the weapons community that

would inevitably result. It would be difficult to maintain experienced personnel at our weapons laboratories and at the Nevada Test Site during an extended moratorium. This was our experience in the 1958–1961 moratorium. The long-term effect of a loss of people is potentially the most damaging effect of a moratorium followed by a resumption of testing.

INTRODUCTION OF DOE LABORATORY DIRECTORS

Senator WARNER. I wonder if you would accommodate the Chair in the following respect.

I understand, Mr. Morgan, that there is a continuation of your presentation.

Mr. MORGAN. Yes, sir.

Senator WARNER. Would it be too great an inconvenience if you were to yield to the second panel for a period of time? I have to absent myself. Then I will return. Mr. Exon will continue in my absence, and then he will have to absent himself.

So, we will have to overlap.

Mr. MORGAN. Whatever is your pleasure, sir.

Senator WARNER. I would appreciate it, then, if you would yield to the laboratory directors at this time.

Mr. MORGAN. Certainly.

Senator WARNER. Gentlemen, we welcome you. This is a hearing in which I take a great interest, as I already have stated.

Your testimony is not only an essential contribution, but a very valuable one. This year, indeed, you may expect some floor activity unlike what we have had in years past.

Now I do not say this by way of criticism of my colleagues, but more in recognition of their increasing individual and collective interest in the subject that we are covering today.

So, we will just take you in alphabetical order. I do not want to try to determine the rank of this distinguished panel.

Dr. KERR. If it is agreeable with you, Mr. Chairman, Dr. Dacey and I will interchange on alphabetical order.

Senator WARNER. Fine.

STATEMENT OF DR. ROGER E. BATZEL, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. BATZEL. What I had intended to concentrate on this afternoon was the work related to the strategic defense initiatives, the third generation weapons, the issue of where we think the Soviets are in this situation, and the need for special nuclear materials as a hedge against our needs in the future.

If that meets with your pleasure, I will go ahead.

Senator WARNER. Please proceed.

UNDERSTANDING NUCLEAR WEAPONS TECHNOLOGY

Dr. BATZEL. The issue I want to concentrate on is our responsibility to understand what is possible in nuclear weapons technology from the point of view of wanting to make sure we understand where the Soviets might be in the development of this kind of technology.

THE NUCLEAR WEAPONS PROGRAM HAS TWO PRIMARY MISSIONS

Maintain a viable, modern nuclear stockpile

- **Respond to DOD requests for new weapon systems**
- **Maintain current stockpile**

Ensure that our nuclear weapons expertise is second to none

- **Explore advanced nuclear weapons concepts**
- **Improve our understanding of weapon physics**
- **Understand what is possible**

We clearly understand and will meet our commitments as far as the weapons needs for the Department of Defense are concerned. That comes first. But we feel very strongly that understanding what the potential is in these new concepts and advanced technologies is fundamental to the future defense posture of the United States.

As an example, we have talked previously about the x-ray laser. This is a system where you use a nuclear explosive as a pump for lasers. [Deleted.] It has a significant potential for the future.

We started this particular program in November 1980, with an understanding that we had something which is real.

It has taken 3 years to sort out the physics to make sure that we know where we are. We do know where we are today. We know from a physics point of view that this technology will work.

We have a way to go to find out all of the details involved. Whether, in the final analysis, it will be a useful and competitive weapon system we still will not know for a while.

But there is a series of experiments planned which will allow us to evaluate that particular question.

[Deleted.]

Senator WARNER. [Deleted.]

Dr. BATZEL. [Deleted.]

To finish, we at the laboratory at Livermore have just completed a demonstration of an isotope separation capability at a plant production level run. We've run our system for over a hundred hours and [deleted]. We have demonstrated that we can, in fact, clean up plutonium for the weapons program.

There is a significant amount of plutonium available to the weapons program which has too much plutonium 240. The available plutonium contains 16 or 17 percent plutonium 240, whereas

the weapons grade uses 6 percent. That material can be cleaned up using isotope separation. That is a capability we have demonstrated just this particular month.

With that, I will conclude.

Senator WARNER. Thank you.

Dr. Kerr?

STATEMENT OF DONALD M. KERR, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY

Dr. KERR. Mr. Chairman, it is a privilege to be able to address you and the committee today on an issue of great importance, the strategic defense initiative.

Like Dr. Batzel, I will restrict my prepared remarks to that area.

STRATEGIC DEFENSE INITIATIVE-LOS ALAMOS PARTICIPATION

PRINCIPAL STRATEGIC DEFENSE WEAPON CONCEPTS

	PRINCIPAL DEFENSE ROLE
CONVENTIONAL INTERCEPTOR MISSILES	TERMINAL
• NUCLEAR AND HIGH EXPLOSIVE WARHEADS	
PROJECTILES ("Kinetic Energy Kill")	MIDCOURSE AND TERMINAL
• GUIDED HIGH VELOCITY PROJECTILES	
• PELLETS, FRAGMENTS AND JETS	
BEAMS ("Speed of Light Weapons")	BOOST AND MIDCOURSE
• LASERS	
– THERMAL KILL (CHEMICAL, FREE ELECTRON)	
– IMPULSE KILL (SHORT WAVELENGTH, X-RAY)	
• PARTICLES	
– NEUTRAL PARTICLE BEAM	
• RF SOURCES	

As a matter of orientation, I think it is worth talking about the great variety of technologies that are being studied at the present time, ranging from interceptor missiles of the sort considered in the 1960's for ABM use, moving on to projectiles, [deleted] and, finally, the whole area of beams, the so-called speed of light weapons, such as lasers, [deleted].

STRATEGIC DEFENSE INITIATIVE
LOS ALAMOS RESEARCH PROGRAM

DIRECTED ENERGY WEAPONS

- NUCLEAR WEAPON DIRECTED ENERGY
- FREE ELECTRON LASER
- NEUTRAL PARTICLE BEAM
- MICROWAVE GENERATORS
- SHORT WAVELENGTH LASER TECHNOLOGY

"CONVENTIONAL" WEAPONS

- RAILGUN LAUNCHER TECHNOLOGY
- NUCLEAR WARHEADS
- HIGH ALTITUDE ELECTROMAGNETIC PULSE WARHEADS

LETHALITY, SUPPORT PROGRAMS

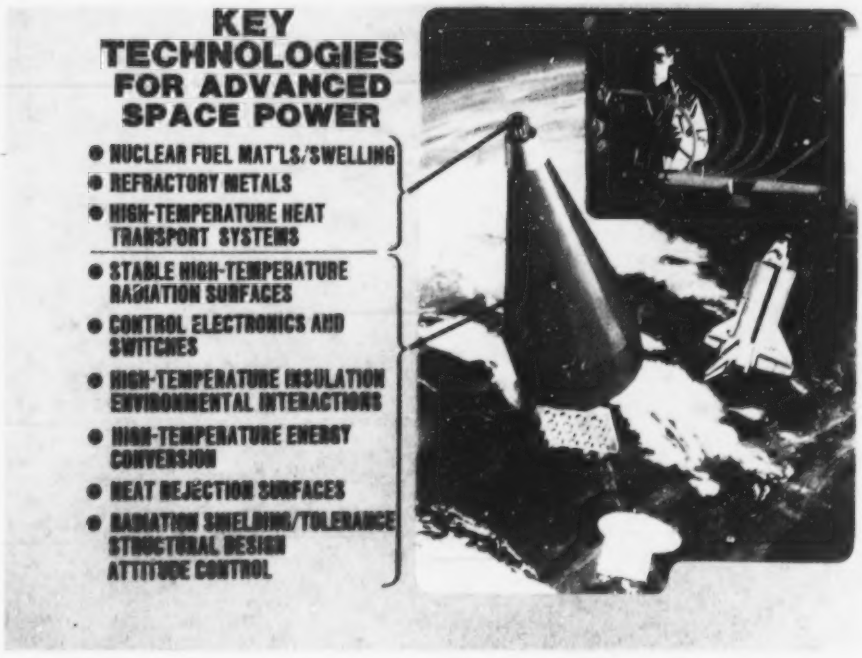
- LASER, PARTICLE BEAM, MICROWAVE LETHALITY
- KINETIC ENERGY KILL LETHALITY
- FOREIGN TECHNOLOGY ASSESSMENT
- COUNTERMEASURES

In terms of what we, at Los Alamos, are doing, we are participating broadly across the area of directed energy weapons. Those areas that we are giving most attention to are shown in the above chart.

[Deleted.]

Senator EXON. [Deleted.]

Dr. KERR. [Deleted.]


KEY TECHNOLOGIES FOR ADVANCED SPACE POWER
• NUCLEAR FUEL MAT'LS/SWELLING
• REFRACTORY METALS
• HIGH-TEMPERATURE HEAT TRANSPORT SYSTEMS
• STABLE HIGH-TEMPERATURE RADIATION SURFACES
• CONTROL ELECTRONICS AND SWITCHES
• HIGH-TEMPERATURE INSULATION ENVIRONMENTAL INTERACTIONS
• HIGH-TEMPERATURE ENERGY CONVERSION
• HEAT REJECTION SURFACES
• RADIATION SHIELDING/TOLERANCE STRUCTURAL DESIGN ATTITUDE CONTROL

SUPPORTING TECHNOLOGIES

Another important area in terms of the broad range of supporting technologies was referred to earlier by Dr. Wagner. This is just to illustrate for you the approach we are taking in the space reactor program. A point design called SP–100 is being worked on. It is to provide a 100-kilowatt space qualified reactor. Other design studies go well above a megawatt, and the technical base being developed would support even higher powers in orbit if they were required.

[Deleted.]

Clearly, materials, reliability, and most importantly, how you eject the heat to a vacuum are the key issues that have to be addressed.

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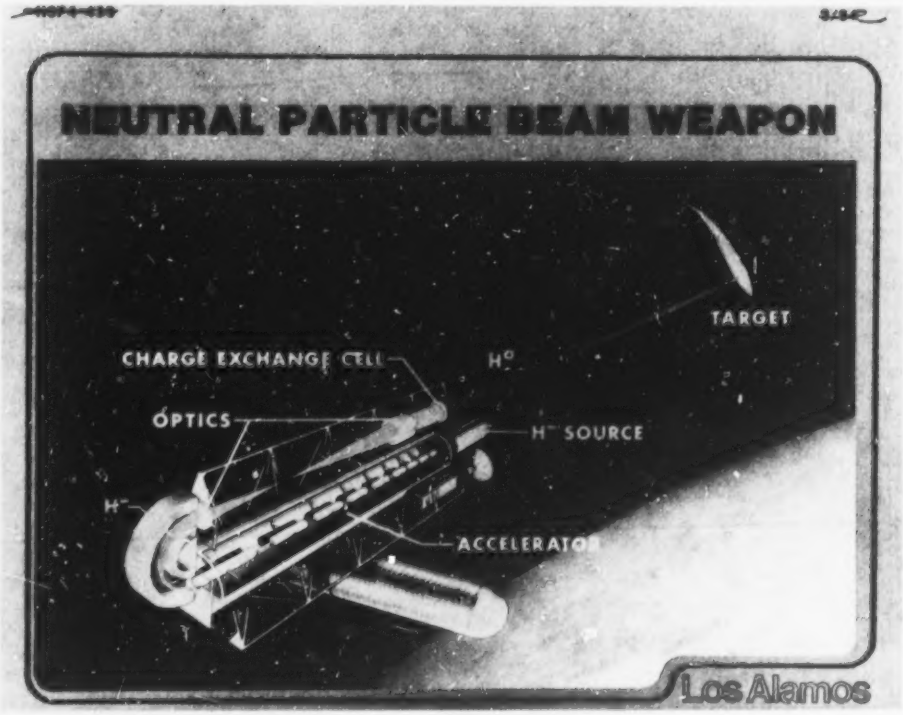


A second area that builds on the same technology for high current accelerators is the White Horse Program, the neutral particle beam program, shown here schematically.

This is not a program that is just a year old. In fact, it is one that has been going on for almost 10 years.

[Deleted.]

I will show you an example of what such a beam will do.

[Chart deleted.]

We have a rock that my colleague, Paul Robinson, can show you, just to give you a sense of just what such a beam does when it interacts with matter.

Basically, you are depositing a tremendous amount of energy in a short time, which allows you to damage the structure and penetrate it. The real difference with particle beams compared to beams of photons—beams of light—is they penetrate much more deeply in matter, and, hence, they are much more effective against buried components and much less easily countered. That is, you simply cannot add shielding because you would have to add such weight that the object you were trying to propel would be too heavy.

This last picture is the low energy end of the accelerator, called the radiofrequency quadrupole. [Deleted.]

Senator EXON. Would you explain to me, in terms that I can understand, what all of that means?

Dr. KERR. Yes, sir.

If we start with the unit we have called brightness, that is the amount of energy per unit solid angle. The solid angle is simply the cone. If I have a source here [indicating] and a spot over there on the wall [indicating], the size of the spot defines what is called the

solid angle. Another way to think of it is the directivity of the beam.

[Deleted.]

Senator EXON. Thank you.

Dr. KERR. I am sorry about the arcane units.

Senator NUNN. What you are saying is over there in the red column is where we are now, and immediately to the left is where we would have to be, is that right?

Dr. KERR. The one immediately to the left is where we would have to be to attack the column called, "future," under the lethality heading.

That is correct, sir.

Senator NUNN. [Deleted.]

Dr. KERR. [Deleted.]

Senator NUNN. [Deleted.]

Dr. KERR. [Deleted.]

Senator EXON. [Deleted.]

Dr. KERR. [Deleted.]

Senator EXON. [Deleted.]

Dr. KERR. [Deleted.]

The policy question of whether we would want to do that is still before us. Our job at the moment is to try to explain to you and to the Department of Defense the technical capabilities they might have. The political and military implications still lie ahead of us and require a great deal of work.

LOS ALAMOS BROAD CONTRIBUTIONS

SUMMARY

- **LOS ALAMOS IS IMPORTANT CONTRIBUTOR**
- **CONDUCTING LONG-TERM NUCLEAR RESEARCH**
- **FREE ELECTRON LASER LOOKS VERY PROMISING**
- **NEUTRAL PARTICLE BEAM TECHNOLOGY CLOSEST TO REQUIREMENTS**

To conclude my remarks, the point that I wanted to make with you today is that we are contributing broadly across the spectrum

of these defense technology ideas. It is based, very substantially, on the long-term investment in nuclear research and development at the laboratory. You see it directly in the nuclear directed energy weapons. [Deleted.]

Thank you very much.

Senator EXON [presiding]. Thank you, Dr. Kerr.

And now, Dr. Dacey.

STATEMENT OF GEORGE C. DACEY, PRESIDENT, SANDIA NATIONAL LABORATORIES

STRATEGIC DEFENSE INITIATIVE—SANDIA PARTICIPATION

Dr. DACEY. Let me add my thanks to those of my colleagues for the opportunity to talk with you today. I will ask you to shift gears just a little bit because, as you know, Sandia's emphasis is on engineering rather than on science. We are more concerned about system feasibility, the nature of vulnerability and lethality, the kinds of kill, and so, in some senses, we take the opposite side and ask what can we do to prevent these weapons from doing their damage.

STRATEGIC DEFENSE INITIATIVE

- **DEVICE TECHNOLOGY**
- **SENSORS AND DATA PROCESSING**
- **VULNERABILITY AND LETHALITY**
- **HARDENED ELECTRONICS**
- **SYSTEM STUDIES**

We have five areas of activity in the strategic defense initiative case.

The first of those is device technology. Some of you have been to Albuquerque and have seen the high pulse power machines which we have. They were built initially for the inertial confinement fusion activity, but can produce the kinds of energy about which Dr. Kerr just talked, 30 terawatts, which is 30 times the amount of energy that the whole United States produces, in a very small volume. Therefore, we can look at the effects on components and parts in a laboratory without having to conduct a nuclear effects test in the field. In addition to that, we can use these high pulse power machines to produce the kind of energy required to run

some of these devices on a small scale in a laboratory. We are concerned not just about how you kill, but how you would win a battle.

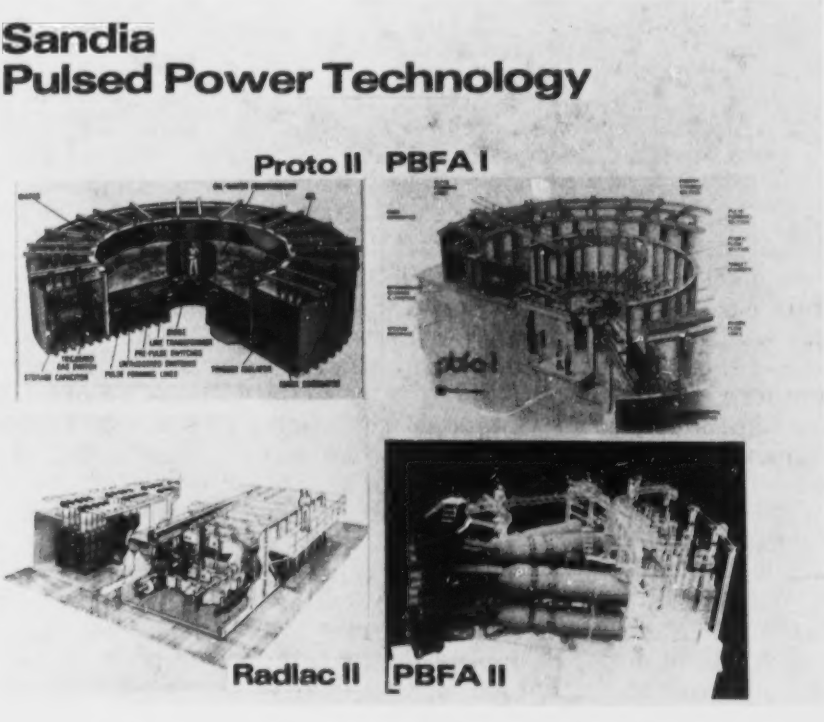
The reason these particle beams work at all is something like the reason that you cannot use a bow and arrow to kill a duck. The bow does not fly as fast as the duck, so you can't catch it. You use either a rifle or a shotgun because even when you get there very quickly you have to use a little lead, but at least you can get there before the duck has moved very far. That is what the beam weapons do to ICBMs. On the other hand, a rifle and a shotgun are different. The size of the pellets are different. Therefore, if you have a rifle, you have to really hit the thing. The shotgun is better. But, if the shotgun pellets are too small, it won't kill the duck.

The analogy applies here. If the duck is wearing a sheet of armor, you probably cannot kill it with your shotgun or your rifle.

Senator EXON. Dr. Dacey, I want to interrupt you and compliment you. You are getting down to a level that I understand.

[General laughter.]

Dr. DACEY. We are concerned about both what does the rifle do and what kind of armor can the duck wear.



Let me talk for moment about some of the capabilities about which I spoke.

This is an example of some of the pulsed power machines which we have at Sandia. The earliest of these is Proto II. It can make beams of x-rays at 1.5 million volts and 6 million amperes. PBFA-I, which is designed for the inertial confinement fusion case, is the

one I spoke of that can produce 30 terawatts, 15 million amperes at 2 million volts.

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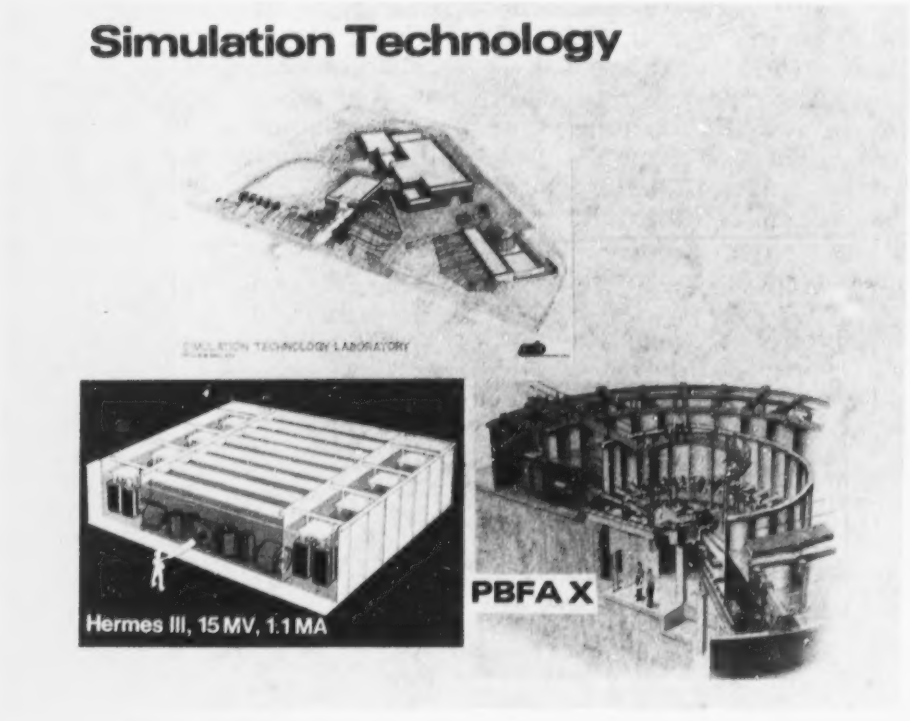


As I said, we are concerned about simulation technology in general. We have just broken ground for a new laboratory at Sandia, and we thank the committee for their support. This will bring together these big machines into one place where we will be able to simulate, to the extent that it is possible with today's technology, the effects of nuclear weapons, the effects of some of these beam weapons, and we will be able to do an actual threat simulation and hardening study to see whether or not the numbers that Dr. Kerr talked about for the future are optimistic or pessimistic.

[Deleted.]

You will forgive me for making a little pitch for the future.

This slide shows [slide deleted] a drawing of the new radiation hardened integrated circuit laboratory which you have authorized and which is under design now. It is intended to push this technology one decade further on in complexity, so that when we get to very high scale integration we will have not just the technical capability but also radiation-hardened capability.

Let me return to the first Vu-Graph and make just one last point.

IMPORTANCE OF SYSTEM ANALYSIS

I think it is very important that all of us do a system analysis as we think about these weapons to see just in what way and for what kinds of battle situations they will be useful. It is clear that we have new kinds of capabilities here, and I think if we do not study

the system implications of those capabilities, particularly if we do not look at what the engineering problems are to bring some of those systems into reality, we will not be ready, when the science is ready, to use them in a practical way.

To me, this means that this initiative, the so-called strategic defense initiative, is very important in the sense that it has removed the taboo against thinking about the science of defensive systems. I would be unhappy, however, if it led people to think that we are ready for a quick deployment. We are ready to learn more about these systems and, hopefully, in the not too distant future we will be able to talk about deployment.

That, essentially, is what I have to say.

Senator EXON. Gentlemen, thank you very much.

FOCUS OF THE STRATEGIC DEFENSE INITIATIVE

I have a question or two and then I will turn over the questioning to Senator Nunn.

I take it from the excellent briefing that you have given us here today that none of you are in a position at this time to say which of these different technologies we should be focusing on. This is a very expensive proposition, naturally, and you have the obligation under contract to come up with the best system possible. You are not far enough along yet, I presume, so that any of you would say we should discard this or we should focus on that.

Do all three of you feel that we should continue on this broad-based system of testing and evaluation before we start focusing on one or two systems that we think would be the most effective?

Anyone can respond.

Dr. DACEY. Well, I will say that certainly from the system point of view—from our capabilities and from what we know about science—[Deleted].

Dr. KERR. I certainly would agree with that.

Dr. BATZEL. I think that is just the right position to take. We need a broad technology based effort in this area and no commitment to a system at this juncture, in my opinion.

ADEQUATE FUNDING LEVELS

Senator EXON. And you are saying that you are getting the right amount of funding that you think you need to get the job done?

Supposing we gave you a blank check. Could you cut the time down [deleted].

Of course, we are not going to do that.

Dr. BATZEL. One certainly could speed up the process of development within reasonable limits and surely additional resources would be welcomed and useful, within limits.

Senator EXON. Within limits.

Dr. KERR. [Nods affirmatively.]

Senator EXON. What I am trying to zero in on, and I was just pressing you a little bit, is as follows:

Really, I think what you are saying is, regardless of how much money we spend, we could not shorten by much [deleted]. Is that a fair assessment of what you are saying?

Dr. BATZEL. Yes, sir; I would be reluctant to promise to take much time off that [deleted]. You can take some off.

Senator EXON. Thank you.

Senator Nunn.

Senator NUNN. I have no questions, Mr. Chairman, but I did enjoy the presentation.

Senator EXON. Senator Bingaman.

Senator BINGAMAN. It's all right with me if you need to get on to something else.

Senator EXON. No; I don't need to go on to anything else. You go ahead with your questions.

VERIFICATION TECHNOLOGY

Senator BINGAMAN. Let me ask a few questions, if I may, about verification technology.

Maybe Dr. Kerr could respond, or any of the other witnesses.

Are we at the present time doing all that we need to be doing in developing verification technology? Could you give us some idea of what is being done at the present time at Los Alamos, for example.

Dr. KERR. I will try briefly to answer your question and could supplement it for the record, if it is useful.

[Dr. Kerr's letter to Senator Warner dated April 13, 1984, appears on page 135.]

Dr. KERR. It is nice to be able to report to the committee that the competition for resources that became evident last year, where it was doubtful whether we and Sandia could meet our obligations, for example, to provide sensors for the GPS system, has been taken care of by additional funds made available by the Department of Energy.

In addition to the work we do to monitor the Limited Test Ban Treaty which relates to detection of explosions in the atmosphere and space, I think there is still a need for further work in the verification area. There are concerns that attend our ability to verify the Threshold Test Ban Treaty, which we observe, even though it has not been ratified by the Senate. There still remain technical issues about various approaches to doing that verification. Some of those questions could be resolved by experiments, for example, done in association with tests at the Nevada test site.

It is my view, at least, that before we attempt to negotiate new terms for that agreement, we ought to have our technical facts in hand, relative to our abilities to verify any present or future limitations on testing.

Senator BINGAMAN. Does anybody else have a comment on the general issue of verification technology?

Dr. DACEY. I would like to make one comment. I am concerned that, in the absence of forward-looking research for verification technology, we may find ourselves negotiating treaties and then wondering how we are going to verify them. I would hope that in the future we would have a better tech base when we enter into new kinds of negotiations than it is my perception we have had in the past.

Dr. BATZEL. I would just reaffirm Dr. Kerr's statement with respect to the Threshold Test Ban Treaty. We do need additional

data in order to have a solid technical base for future negotiations about the steps one might have to take to improve the verifiability of that particular treaty.

Senator BINGAMAN. Let me just say that the subject of antisatellite weaponry has come up in many of our hearings.

The position we seem to be hearing from the administration is that the problems of verification make arms control largely an impossibility in that area and possibly in some other areas. This has led me to conclude that if there is anything more that can be done to develop verification technology, which will be helpful in presuming the ability to agree to things, if we can ever reach that point, we need to take those actions.

Dr. KERR. If I might address that point, Mr. Chairman——

Senator EXON. Certainly.

Dr. KERR [continuing]. One of the difficulties with ASAT verification has to do with numbers.

[Deleted.]

[Deleted.]

Dr. DACEY. I would like to make one additional point on that same subject. It is one thing to verify that a nuclear explosion has taken place underground because it causes seismic waves which you can detect. It is quite another to know whether or not a potential enemy is testing a beam weapon inside of a building. The verification of some of these modern weapons will be a very much more difficult task than the verification of nuclear explosions because they have less by way of physical phenomena to look at. Furthermore, these beam weapons, while we have been talking about them today primarily as antiballistic missile systems make perfectly good antisatellite weapons.

GAS LASER PROGRAM

Senator BINGAMAN. Mr. Chairman, if I may, I would like to ask about the gas laser program.

I believe the administration has proposed a significant cut, some 30 percent from the 1984 level, with regard to this Antares facility at Los Alamos.

I would be interested in knowing what your views are as to the usefulness of that facility to obtain some additional information and the length of time that that might have been operational or when it might have to be shut down under the present proposal.

Dr. KERR. The present proposal is $13 million less than it would take for us to keep that facility operational for the entire year of fiscal year 1985. The facility was completed at the end of calendar 1983. It represents a capital investment of some $62.5 million, to which there is an R&D component of a further roughly $30 million.

We began operating it, roughly, at Christmastime. It is up and running and conducting experiments.

Presently, it is the most powerful operating laser in the world, at least we think so.

At the present requested level, we would have to cease operating that facility in mid-1985 and we would reduce our staff at that time by about 125 people.

The intended use of that facility is, first, to study the ability to come close to fusion reactions in a laboratory environment. We expect that it will be very useful from the point of view of studying weapons effects, weapons lethality. We also at the present time are looking at its use in terms of looking at lethality and vulnerability similar to that provided by these particle beam and laser weapons that I described earlier.

We believe there is an experimental program of 2 years' length at a minimum—that is, 1984 and 1985—that will, in fact, justify the original investment in that facility. We would like the opportunity to go for the full year.

Senator BINGAMAN. Mr. Chairman, I just have a few other questions which I believe I will submit for the record, if that is all right with the chairman.

Senator EXON. Certainly.

Senator BINGAMAN. I appreciate the opportunity to ask those questions.

Senator EXON. Thank you, Senator. Those were good questions.

STRATEGIC DEFENSE—BATTLE MANAGEMENT

Returning to one last question that keeps plaguing me, gentlemen. Let's assume that 13 years from now we have developed one of these beams and it is ready for deployment. I suspect that once we had the ultimate defensive weapon for taking incoming ICBM's, either shortly after they are launched or at midpoint or when they are coming in, we would still have to rely, under our present thinking, on satellites to tell us what is going on; where the launch was; and where we should be shooting back; or, to use the good doctor's description earlier, the ducks are taking off someplace in Siberia, and we want to get them before they get too far off the river.

Under all of our present plans, are they not based principally on maintaining satellites that would tell us what is going on?

Is that a correct assumption on my part?

Dr. KERR. Yes, sir.

You would still need the ability to detect the launch point and observe the missile during the early burning phase of its trajectory in order to establish where it is going and whether it is a threat to you.

Further, when you choose to engage the target, you have to have an acquisition and discrimination system so you will engage real targets rather than decoys or tankage from the missile.

All of that will put even greater stress on the command, control, communications, and intelligence capabilities beyond the stresses that we see today, simply for the command and control of our strategic forces. It, too, would have to be worked in parallel with the new technologies.

Senator EXON. My point is, and what concerns me about this whole concept is, here I am, sitting out there in my duck blind, and I get the word that not ducks but geese are coming in. I get my shotgun or my rifle—we generally use shotguns on ducks and geese in my part of the country—and it is all loaded up and it is brand new. I am an expert shot, but I forget to take off my glasses, my

dark colored glasses. They are coming in at me and I cannot even see them.

My point is this: it would seem to me to be relatively easy by that time, 12 years from now, for us or the Soviets to develop a system where we would wipe out instantaneously the satellites and then launch the attack, and then wouldn't we be blind to it?

Dr. DACEY. Perhaps I could push the duck analogy a little further. It is certainly true that one must have a command and control system. For example, suppose you had 10 hunters, all trying to shoot these ducks. You don't want them all to shoot the same duck. You must be able to tell them look, you take this duck, I will take that one, and the third fellow take the duck over there. This is what is called battle management, of course.

This means that you have to have communications, not only among the various weapons, but also with respect to some supercomputer which is deciding where the attack is and keeping the battle plan straight.

As far as just knocking out the satellites is concerned, that is a matter of system design. [Deleted.] Knocking out the satellites themselves provides an early warning.

However, I think that illustrates a very important point; namely, that the system implication of all of this—and much of this is not DOE but DOD kinds of systems considerations—is a very complex problem. It is part of the reason that I said we are not ready to build anything for 10 years.

Senator EXON. Gentlemen, I thank you all for your testimony. You have been tremendously helpful, and I just hope that people like you, who understand these things as we do not, can somehow, without breaching security, help the people of the United States understand that we are not going to have a foolproof system. I have seen some news stories emanating from certain circles suggest to the American people that if we wanted to, by 1991, we could have a foolproof system that would assure the defense of the United States. I think some of that kind of thinking is somewhat dangerous.

Gentlemen, thank you all very much.

Now we will recall Secretary Morgan and the first panel back to the witness table. We will ask you to proceed with the last 20 minutes of your testimony that we interrupted a long, long time ago.

We thank you for your patience.

Mr. MORGAN. Thank you, Mr. Chairman.

I will have to say that the rest of my panel has departed for the west coast, so I will try to finish up alone.

Senator EXON. We would be very happy to listen to you.

STATEMENT OF ROBERT L. MORGAN—Continued

Mr. MORGAN. First, I would like briefly to go through the substance of our program.

WEAPONS PROGRAM

DEFENSE PROGRAMS MISSION

Design, test and manufacture all U.S. nuclear weapons.
Develop inertial fusion in support of the Nation's military needs.

Produce all nuclear materials required for the U.S. weapons program and manage defense nuclear waste.

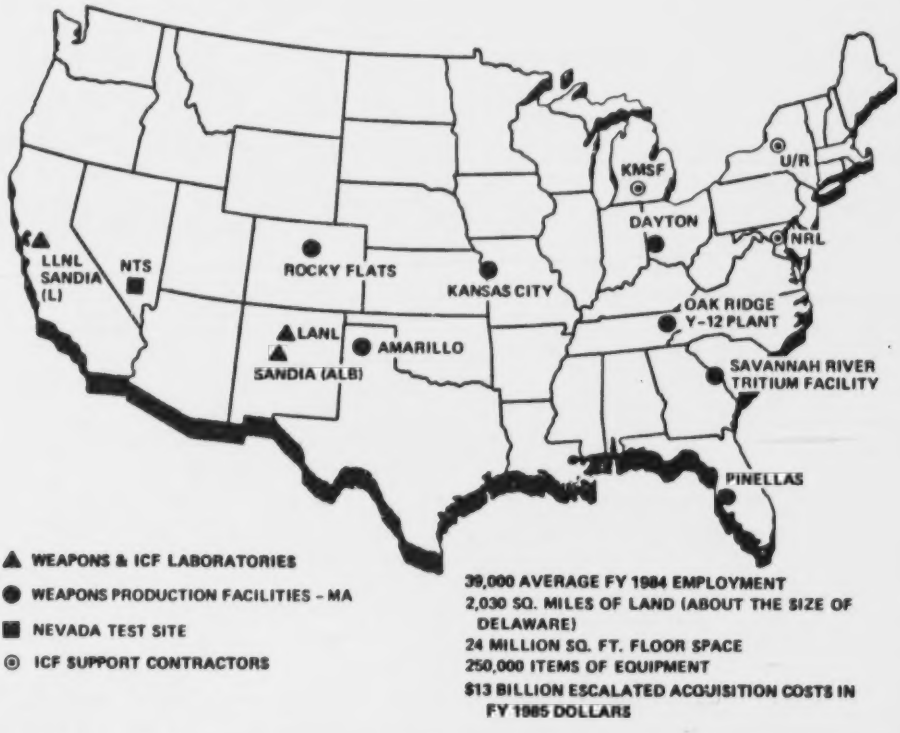
Ensure the protection, control and accountability of special nuclear materials and DOE facilities.

Ensure verification of international arms agreements and control the transfer of sensitive technology and equipment.

Control the dissemination of classified information.

Mr. MORGAN. We have heard from the laboratories about their design and research activities. What I will talk about first is the weapons production complex and try to cover that as briefly as I can.

As you know, we not only have the weapons facilities, but we also have inertial confinement fusion activities that are conducted at KMS, the University of Rochester, and Naval Research Laboratory.



The three laboratories are located here. Then, as you know, at Rocky Flats we do the machining of plutonium, we do the electronics fabrication at Kansas City, the detonators at Dayton, OH, uranium machining at Oak Ridge, the tritium production and tritium loading at Savannah River, the neutron generators are made at Pinellas, and all these parts come together at Amarillo where we actually assemble the weapons from the components of the rest of the system.

INVESTMENT STRATEGY FOR 1984 AND BEYOND

- **MEET PRODUCTION NOW AND IN THE FUTURE**
  - — DELETED
- **INCREASE RD&T MANPOWER 15%**
- **INCREASE TESTING**
  - — DELETED
- **REVITALIZE AGING PLANT**
  - — **RESTORATION**
  - — **RD&T FACILITIES**
- **IMPROVE CERTAIN WEAPONS IN THE STOCKPILE**
- **PROVIDE MANAGEMENT AND MANUFACTURING FLEXIBILITY**

The investment strategy for 1984 and beyond is shown here. We are interested in meeting our production now and future potential with the surge requirement that will produce [deleted] more than we are now capable of. We want to increase our research, development and technology manpower, increase testing, revitalize the aging plant, improve certain weapons in the stockpile, and provide management and manufacturing flexibility.

WEAPONS BUDGET REQUEST

FY 1985 CONGRESSIONAL SUBMISSION
(B/A $ IN MILLIONS)

	FY 1983 ACTUAL	FY 1984 ESTIMATE	FY 1985 ESTIMATE AUTH.	FY 1985 ESTIMATE APPROP.
RESEARCH AND DEVELOPMENT	738.5	844.3	1,085.2	1,085.2
TESTING	446.9	565.0	638.0	638.0
INERTIAL CONFINEMENT FUSION	189.8	169.7	138.0	138.0
PRODUCTION AND SURVEILLANCE	1,916.8	2,136.7	2,604.8	2,621.7
PROGRAM DIRECTION	54.4	57.5	60.2	60.2
TOTAL WEAPONS ACTIVITIES	$3,346.4	$3,773.2	$4,526.0	$4,543.1

	FY 1984 SUPPLEMENTAL
• STATE SALES/USE TAX LIABILITIES	$37.6
• SAFEGUARDS AND SECURITY, VL	20.4
• ENVIRONMENT, HEALTH, AND SAFETY, Y-12	7.6
TOTAL WEAPONS ACTIVITIES	$65.6

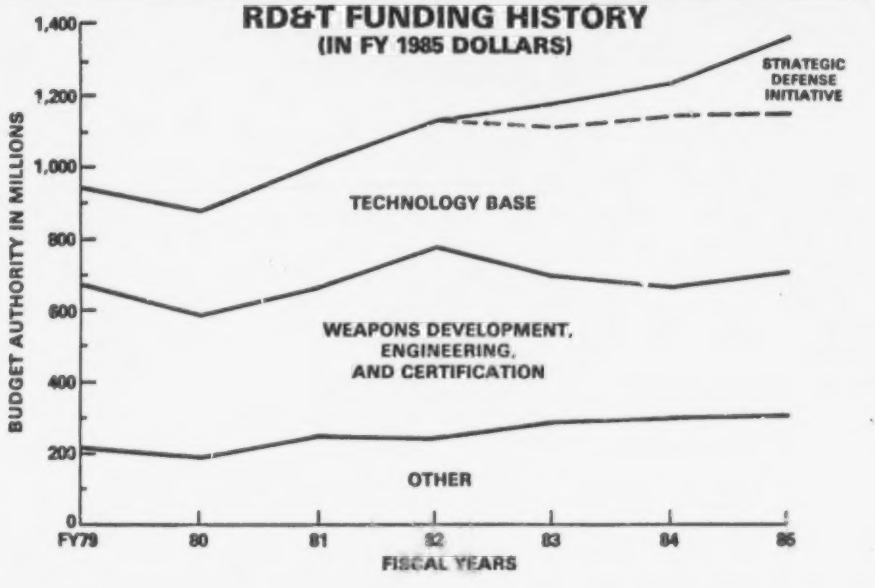
The budget for the weapons production activities is summarized here, at $4.5 billion. There is approximately $1 billion in R&D, $600 million in testing, $138 million in inertial confinement fusion, $2.5 billion in the actual production and surveillance activities, and $60 million in the program management.

This is what we have classically called for many years the mountain chart. [Chart deleted.]

This is where we are in 1985 [indicating]. We are actually producing nine weapons systems, nine new weapons systems for deployment. We are doing retrofit on the poseidon warhead and we are doing stockpile improvement on three systems. That is all going on [deleted.]

On our testing activities, you can see that we have done mostly development engineering, and certification testing in the early and mid-1970's. We were down in the technology area and now we are slowly climbing back up [deleted].

DOE WEAPONS PROGRAM
NEW CONCEPTS AND PROGRAM BALANCE

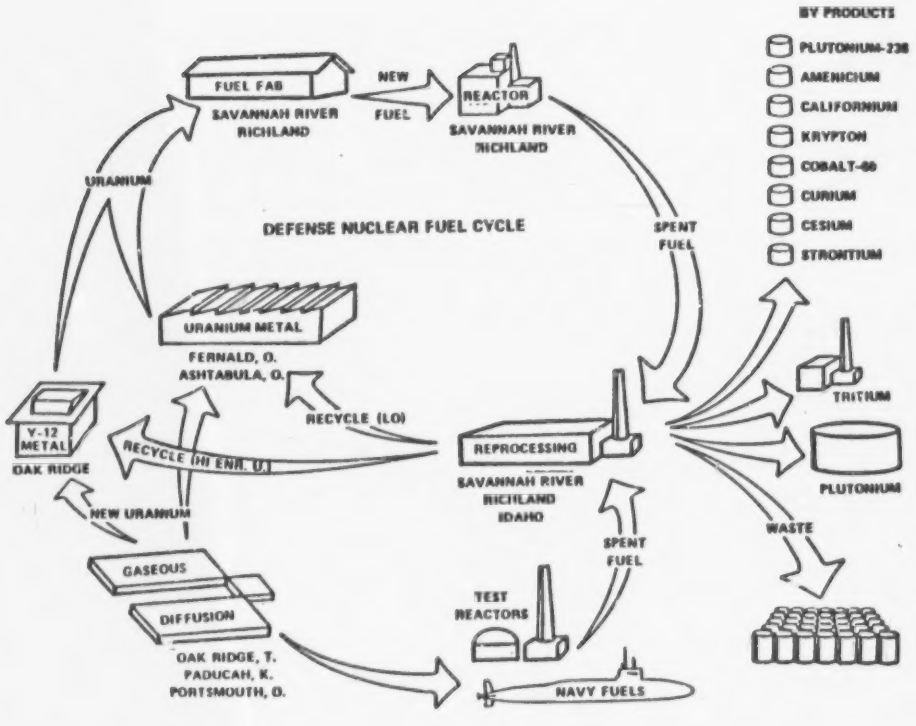


Our RD&T funding history is shown here. I would just like to point out that since 1982 our increase in RD&T has been in the strategic defensive area.

We believe that in the weapons program we will meet all of the nuclear weapons stockpile memorandum requirements. We will support growth in SDI, continue the restoration program, continue our 1984 test revitalization program, support long-term commitment to the environment, safeguards and security, support a viable ICF program and continue the stockpile improvement program.

NUCLEAR MATERIALS PRODUCTION

In the nuclear materials production area, our budget request is $1.8 billion.



This is what we do in the production area. We take enriched uranium in the diffusion plants and convert that material to metal at the Y-12 facility in Oak Ridge. We take the material from Y-12, process it through the fuel fabrication facilities, at Savannah River, and put it in the reactor to be irradiated. After discharge from the reactors, the spent fuel is transferred to reprocessing facilities to separate out the useful reactor of products tritium, plutonium, other special isotopes, and residual uranium which is recycled into more reactor fuel. We store the remaining waste in large tanks for subsequent processing before future repository disposal. At Idaho, we also process the spent Navy propulsion fuels from their reactors to recover valuable enriched uranium to fuel the reactors at Savannah River.

The materials production activities take place primarily at Savannah River, Oak Ridge, Richland and Idaho Falls. There are supporting activities at the Lawrence Livermore and Los Alamos National Laboratories.

[Deleted.]

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1984*		FY 1985	
	AUTH.	APPROP.	AUTH.	APPROP.
BASE ACTIVITIES				
CURRENT OPERATIONS	$ 919.6	$ 933.6	$1,105.0	$1,105.0
L REACTOR	64.5	64.5	65.0	65.0
PUREX	88.7	88.7	90.8	90.8
SECURITY	80.8	102.1	90.1	96.8
ENVIRONMENTAL	59.3	59.3	58.1	58.1
SUBTOTAL	$1,212.9	$1,248.2	$1,409.0	$1,415.7
PRODUCTION INITIATIVES				
RESTORATION	$ 107.6	$ 107.6	$ 84.5	$ 84.5
IDAHO RESTORATION	5.5	5.5	14.1	14.1
PRODUCTIVITY IMPROVEMENTS	25.3	25.3	50.7	50.7
MARK 15 CORES	4.0	4.0	113.5	113.5
SPECIAL ISOTOPE SEPARATION	71.9	71.9	39.0	39.0
PROCESS FACILITY MODIFICATION	12.5	12.5	0.0	0.0
REACTOR SAFETY	12.2	26.7	14.4	25.7
SUBTOTAL	$ 239.0	$ 253.5	$ 316.2	$ 327.5
OTHER				
NAVAL REACTOR SUPPORT	$ 120.0	$ 120.0	$ 121.0	$ 121.0
TOTAL MATERIALS PRODUCTION	$1,571.9	$1,621.7	$1,846.2	$1,864.2

*INCLUDES PROPOSED FY 1984 SUPPLEMENTAL

This is a look at the budget breakdown for materials production. You can see the cost of our current base operations.

We do have the initiative of restarting the L reactor. We intend to restart that reactor early in 1985. We have been technically ready to run the reactor since October 1983. But we have to obtain from the State of South Carolina the appropriate permits and complete the environmental impact statement directed by Congress. We intend to build a lake on the Savannah River site so that the discharge of heated water from L reactor will not violate the thermal discharge standards for the swamp.

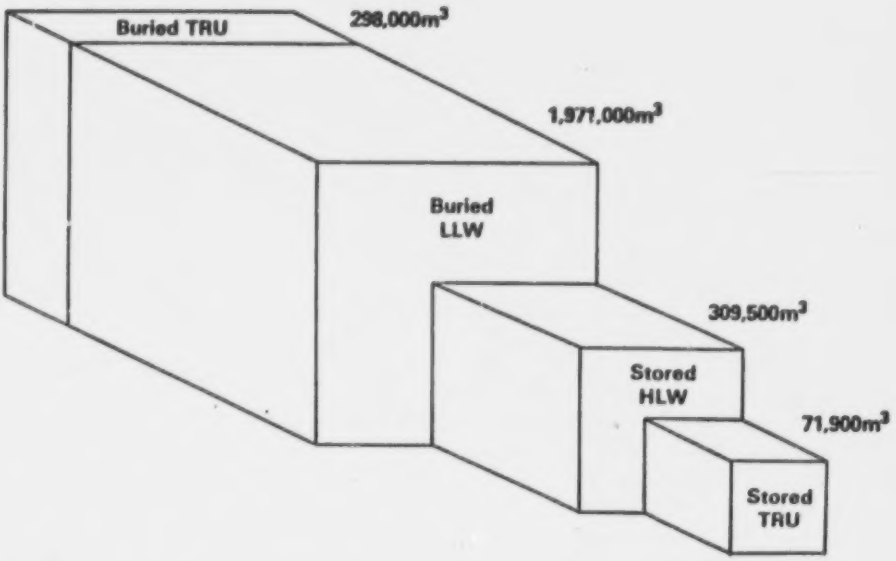
The Purex facility at Richland was restarted in November 1983 and is processing fuel from the N reactor.

We have [deleted] security and environmental problems at several of our sites for which we have requested funding.

The chart also shows funding for our production initiatives. It shows a large increase for the Mark 15 high productivity reactor cores at Savannah River, of which $90 million is for increased uranium enrichment activities at Oak Ridge. We believe that we have another production alternative, the Mark 22 S-25 core, that will give us [deleted] of the Mark 15 production increase and could reduce our budget by approximately $90 million.

Also shown is the special isotope separation program, which has been discussed, and the other nuclear materials production activities.

Defense Waste Inventory



Turning to the waste area, this figure just gives you an idea of the defense waste inventories that we currently have on hand, buried TRU waste, buried low level waste, stored high level waste, and stored TRU waste.

Those are the efforts that we are addressing in the Defense Waste and Byproducts Management area.

BYPRODUCTS AND BENEFICIAL USE

- **CESIUM 137 BENEFICIAL USE PROJECTS**
  - **ALBUQUERQUE MUNICIPAL SLUDGE IRRADIATOR**
  - **TRANSPORTABLE CESIUM IRRADIATOR**
  - **PORK IRRADIATOR**
  - **CESIUM AGRICULTURAL COMMODITY IRRADIATOR**
- **DEFENSE ENERGY PROJECTS**
  - **TRITIUM LIGHTING FOR MILITARY**
  - **DEFENSE TERRESTRIAL REACTOR**
  - **NORTH WARNING SYSTEM**
  - **500 WATT THERMOELECTRIC POWER SUPPLY (STRONTIUM 90)**

One of the areas that we are working on is utilizing the cesium 137 in irradiators. We are having built four demonstration irradiators that will, first, irradiate pork, which will reduce the possibility of trichinosis; second, treat municipal sludge in Albuquerque; third, irradiate food products with a transportable cesium irradiator; and finally, treat agricultural commodities, because using the chemical EDB could cause a serious health problem. We can irradiate with cesium 137 leaving no residual radiation. That would then provide that irradiation capability regarding the medfly, coddling moth, and so on.

In the defense energy projects, we are providing tritium lighting for the military and State entities. Tritium lighting was used in the tactical assault invasion of Grenada.

Defense terrestrial reactors and a North Warning System are listed. We are working with the Air Force in providing conceptual design for those activities.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT
FY 1985 BUDGET REQUEST
(BA IN MILLIONS)

	FY 1984	FY 1985	
	APPROP.	AUTH.	APPROP.
INTERIM WASTE OPERATIONS	$314.0	$319.3	$329.0
LONG-TERM WASTE MANAGEMENT TECHNOLOGY (DEFENSE WASTE PROCESSING FACILITY)	211.3 (159.8)	334.2 (267.7)	334.2 (267.7)
TERMINAL STORAGE (WIPP)	137.7	87.1	87.5
BYPRODUCTS AND BENEFICIAL USE	15.6	0	0
PROGRAM DIRECTION	2.5	2.1	2.1
TOTAL	$681.1	$742.7	$752.8

The budget in that area is approximately $750 million, and deals with the interim waste operations, long-term waste management technology terminal storage and byproducts and beneficial use.

SAFEGUARDS AND SECURITY

In security and safeguards, the major concerns we have here are endangering the public health and the safety and disruption of the

stockpile. We are very concerned about the security of our facilities.

FY 1985 CONGRESSIONAL BUDGET REQUEST
DOE-WIDE CROSSCUT BUDGET
(In Millions)

	FY 1983	FY 1984	FY 1984 PROPOSED SUPPLEMENTAL	FY 1985 AUTHORIZATION REQUEST
OPERATING EXPENSES	$317.3	$360.4	$20.0	$411.9
CAPITAL EQUIPMENT	26.3	33.9	—	30.2
CONSTRUCTION	14.8	30.3	44.3	123.7
TOTAL	$358.4	$424.6	$64.3	$565.8

The budget we are talking about is shown here. Looking at the operating expenses, you will see how that has grown mainly because of increased guard forces. In construction activities you can see that our budget has gone up because of those areas that we have identified as threats to our facilities.

THREAT

- **THEFT OF SNM OR UNAUTHORIZED CONTROL OF A NUCLEAR DEVICE**
  - **TERRORISTS**
  - **CRIMINALS**
  - **ANTI-NUCLEAR EXTREMISTS**
- **INDUSTRIAL & RADIOLOGICAL SABOTAGE**
  - **TERRORISTS**
  - **PSYCHOTICS**
  - **DISGRUNTLED EMPLOYEES**
  - **ANTI-NUCLEAR EXTREMISTS**

The threat that we are talking about is shown here—theft of special nuclear material or unauthorized control of a nuclear device by either terrorists, criminals, psychotics, disgruntled employees, or antinuclear extremists.

DOE SAFEGUARDS AND SECURITY PLANNING AND PROGRAMMING

- THREAT
- SITE VULNERABILITY ASSESSMENTS
- SITE SAFEGUARDS AND SECURITY PLANS
- SENIOR MANAGEMENT REVIEW
- PROGRAM FORMULATION
- BUDGET FORMULATION
- INSPECTION AND EVALUATION

The way we are looking at the program and planning in the security area is shown here. We revised our threat guidance during January 1983. We are looking at the site vulnerability assessments against that threat. We are looking at site safeguards and security plans to obviate those vulnerabilities, formulating program plans to correct them, and budgeting for the required funding.

Our success will be measured by conducting assessments at each of those sites on a periodic basis. We intend to have assessments on each of our major facilities every 18 months.

MAJOR LESSONS LEARNED

This shows major lessons learned in the past year; such as the need for corporate commitment; security education and awareness; reduction and consolidation of special nuclear materials; defense in-depth; cross fertiliation; and cost effectiveness.

We are conducting intensive training for our guards. They are highly motivated, and we are very, very satisfied with the activities and the equipment they currently have.

We have also increased security at some of our facilities. [Deleted.]

MAJOR CONTINUING ACTIONS

- IMPLEMENTATION OF NSC DIRECTION
- AIRSPACE RESTRICTIONS
- OUTSIDE ASSISTANCE
- PHYSICAL FITNESS STANDARDS
- EXPANDED HUMAN RELIABILITY PROGRAM
- OPERATIONS OFFICE ANNUAL REPORTS
- SAFEGUARDS & SECURITY SITE PLANS
- SAFEGUARDS & SECURITY TRAINING ACADEMY
- EXPANSION OF INSPECTION & EVALUATION ACTIVITIES
- VULNERABILITY ASSESSMENTS
- DEFICIENCY/CORRECTION ACTION TRACKING SYSTEM

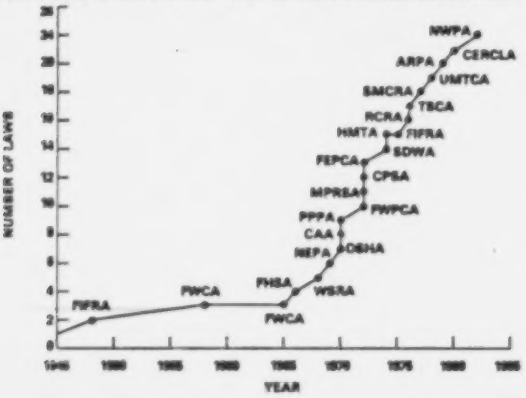
These are major ongoing activites that we are doing in the safeguards and security area. We are implementing the National Security Council direction. We have participated in hearings with the Department of Transportation in the last week on aerospace restriction as to the exclusion area over DOE's nine major facilities. We are promulgating physical fitness standards. There was a court action in the State of Washington on our standards. We lost the case on procedural grounds so we will have to go back and reinstitute that process through rulemaking to make sure that we will be able to test all of the guards throughout the complex to assure that they can pass physical fitness tests. We have participation on a voluntary basis only now. We are expanding the inspection and evaluation activities to include inspections at each facility once every 18 months.

SAFEGUARDS AND SECURITY SUMMARY

In summary, we do recognize [deleted] vulnerabilities that exist. We have initiated quick fixes where appropriate. We have increased the guard forces where appropriate. [Deleted.] These are some of the reasons for our increased budget.

We do have a systematic plan to address the deficiencies and take corrective actions. We do believe in an aggressive oversight activity.

LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA – FEDERAL INSECTICIDES, FUNGICIDE, AND RODENTICIDE (1946, 1972, 1975)
FWCA – FISH AND WILDLIFE COORDINATION (1958, 1965)
FHSA – FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA – WILD AND SCENIC RIVERS ACT (1968)
NEPA – NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA – POISONOUS PACKAGING PREVENTION (1970)
OSHA – OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA – CLEAN AIR (1970, 1977)
FWPCA – FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972, 1977)
MPRSA – MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA – CONSUMER PRODUCT SAFETY (1972)
FEPCA – FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA – SAFE DRINKING WATER (1974, 1977)
HMTA – HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA – RESOURCE CONSERVATION AND RECOVERY (1976, 1979)
TSCA – TOXIC SUBSTANCE CONTROL (1976)
SMCRA – SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA – URANIUM MILL TAILINGS CONTROL (1978)
ARPA – ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA – COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA – NUCLEAR WASTE POLICY ACT (1982)

In the area of environment, we are playing catchup. This is the best way to describe what has been happening in the environmental front.

There was very little activity through 1965; however, you can see from that point forward that a number of laws have been passed which do affect the environment. So now, we have to go back and make improvements on those facilities. What was considered acceptable in the past is not acceptable at this time. That is the reason for the increase in our environmental request this year, Mr. Chairman.

That, briefly, covers my briefing in a very short time. I did cut down on some of my slides.

Senator EXON. You did an excellent screening job and we appreciate it very much, Mr. Secretary.

Let me ask you a few questions.

When you were talking about your reprogramming and recycling, a question came to mind. What about the Titans that we are taking out? Is there any value in recycling any of that material? Does any of that come back to your agency?

Mr. MORGAN. All of the special nuclear material from all the weapons, when they are brought back, is returned and recycled in the system. In other words, all the enriched uranium, all the plutonium, and the tritium from the limited life components are recycled and utilized. We do utilize every bit of that material.

Senator EXON. The material, then, of the Titans that we are taking out does come back to your system?

Mr. MORGAN. Yes, sir. Absolutely.

Senator EXON. Would you answer my question regarding the public health and safety of the Titan missile as it is presently deployed?

Mr. MORGAN. I don't understand the question, Mr. Chairman.

Senator EXON. There has been a great amount of furor about the Titan missile being an unsafe missile. As one of my colleagues said on the floor of the Senate the Titan missile was more of a threat to the people who lived in that area than it was to the Soviet Union. I thought that was somewhat of an overstatement.

I assume that the Titan program went through testing during its development stage through your agency, isn't that correct?

Mr. MORGAN. Yes, sir, the warhead did. I believe the concern that is being expressed regarding that is the liquid propellant system.

Senator EXON. Correct.

Mr. MORGAN. That is not part of the Department of Energy's responsibility in that we provide only the warhead. We do not provide the propulsion or guidance system.

I believe that all of those are being decommissioned—[deleted].

Senator EXON. [Deleted.]

Mr. MORGAN. Yes, sir. They are decommissioning those right now. [Deleted.]

Senator EXON. But you would not be able to give me an evaluation of the public health and safety as far as the liquid fuel in the Titan is concerned?

Mr. MORGAN. No, sir. That is not within my responsibility.

STRATEGIC DEFENSE INITIATIVE

Senator EXON. I am trying to be reasonable in our assessment of the programs that you and others have talked about here today. This was a chart that you did not put on the Vu-Graph [indicating], but I came across it when I was thumbing through, trying to follow you. It says, in the President's speech of March 23, 1983, "I am directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles."

Do you think that what we have heard here today, even if we are successful as we hope we would be, would eliminate the threat posed by strategic nuclear missiles?

Mr. MORGAN. I believe that we should aggressively pursue the research activities that have been discussed here by the laboratory directors. I did take out the slides on the strategic defensive initiative because that was covered adequately, I felt, by the laboratory directors, Mr. Chairman.

Senator EXON. Would you care to answer my question as to whether or not you feel that any of the presentations that have been made here today, if successful in reaching our and the President's hope, would eliminate the threat posed by strategic nuclear missiles?

Mr. MORGAN. I believe that is possible, if we can develop these systems.

INCREASED SECURITY THREATS

Senator EXON. With regard to the threat in increased security that you talked about, for which I salute you, it looks like you have taken some aggressive steps in that area. Are you using trained dogs in the security force?

Mr. MORGAN. In some locations we do have trained dogs. We do not have trained dogs at all locations.

Senator EXON. Is that something that we should be pursuing? Are not trained dogs quite effective in this security area?

Mr. MORGAN. In some locations we believe they are very effective, and we are using those in areas where we believe they are beneficial.

[Deleted.]

Senator EXON. Senator Warner just returned. His timing could not have been better.

Mr. Chairman, I must leave now. I am late for an appointment.

I want to thank you, Mr. Secretary, and those who have appeared with you today. You have been tremendously informative and interesting, and we thank you for taking the time to come up here to help us understand what is going on in these programs for which we have responsibility through funding.

Thank you very much.

Senator Warner, we have just listened to an excellent presentation by the Secretary. I have just finished my questions and was about to recess the meeting until you returned when you made your magical entry. I am pleased now to turn the meeting back to you, Mr. Chairman.

Senator WARNER [presiding]. I thank my distinguished colleague on this subcommittee for presiding in my absence.

Perhaps we could ask the laboratory directors to join the Secretary at the witness table so that we could have one large panel.

[Pause.]

FISCAL YEAR 1985 BUDGET AMENDMENT

The Secretary of Defense, presumably in conjunction with the Secretary of Energy, is preparing for the Congress a budget amendment reflecting the recent expressions by the President to make a reduction in defense spending.

Is it premature to ask you gentlemen whether or not that series of actions will impact on your budgets?

POSSIBLE BUDGET CUTS

Mr. MORGAN. Mr. Chairman, I was advised informally by the representative from the Department of Defense that they were in the process of reviewing a budget cut on the Department of Defense side.

As to the resolution of where they are, I understood there were some presentations that were to be made on the results of the Department of Defense review. To my knowledge, that has not been consummated at this time.

We were looking at areas of potential cuts in the Department of Energy side, but we do not have a target number provided to us at this time.

We have reviewed our budget and believe, because of the high uranium enrichment costs, that there is an alternative low cost way that we can increase our production of materials. So we are suggesting that we could tolerate a cut of approximately $100 million without major impacts on our production activities. Until the DOD cut is made, we do not know what weapons will be affected. So, we are not cutting or looking at making any cut until there is a change in the nuclear weapons stockpile program.

Senator WARNER. I presume that the laboratories at this point have not addressed this question.

NEW PRODUCTION REACTOR

Now, the new production reactor, for several years you have been talking about building a new reactor to produce plutonium and tritium. In view of the fact that the existing reactors are aging, where do we stand on those plans?

Mr. MORGAN. Sir, we are currently performing studies and looking at three alternative types of reactors at three locations, that is, a light water reactor, a high temperature gas reactor, and a heavy water reactor at Hanford, Washington, at Idaho and Savannah River.

Shortly we will send a letter to this committee and to the other committees that oversee our activities requesting that we spend $17.5 million from existing funds in fiscal year 1984, and $5 million in fiscal year 1985, and be allowed to proceed with environmental studies leading to an environmental impact statement and other appropriate studies.

We believe that that will adequately take care of our needs through fiscal year 1985, Mr. Chairman.

Senator WARNER. And you have fiscal year 1985 funding for that?

Mr. MORGAN. Yes, sir.

We have requested $5 million in fiscal year 1985 for that activity.

SITE SECURITY

Senator WARNER. On the subject of security, the Department has been criticized in recent months for the security of your facilities connected with the nuclear program, Mr. Secretary. Characterize for us the state of security at your facilities.

Mr. MORGAN. We believe that we have made substantial improvements in the security at our various locations. We believe that regarding the outside threat, we have taken adequate measures, in many cases temporary, by putting up concrete blocks, tying down fences, and increasing the permanent guard forces. Until we complete all the security projects that we have identified, we will not be comfortable. We still have vulnerabilities for which we are trying to make quick fixes until we can get the appropriate systems in place. Thus, we have additional guards and temporary facilities, temporary lighting, temporary guard towers, and so on. These will satisfy the external threat.

[Deleted.]

Senator WARNER. Is there reasonable parallelism between the security provided by DOE and DOD.

Mr. MORGAN. I cannot speak to the DOD security in the overseas locations, but I am aware that they are utilizing some of the R&D and the efforts with which Sandia is helping us.

PARALLEL SECURITY APPROACHES

Senator WARNER. Dr. Dacey, recognizing your expertise in this area at the laboratory, what I am about to say is not in the form of a question, but is, rather, a statement.

The committee is concerned as to the extent that we are going to explore means by which to get a parallelism in this area.

Dr. DACEY. Senator, as you well know, for many years, Sandia has been exploring the technology which underlies security, that is, the kinds of fencing, the kinds of microwave barriers, the kinds of closed-circuit television, sticky foam, all sorts of ways of coping with security threats of various sorts.

There exists now, I think it is fair to say, a body of technical knowledge which can prescribe quite well how to meet a pretty broad range of threats. The Air Force, the Army, and the Marines, most recently, after the Lebanese tragedy, have been increasingly using that technology and using us as consultants to try to help them to meet the threats that they perceive.

But the most important point that I think is worth making is that security is a little like insurance: You just don't know how much is enough. If you give me a threat, I'll tell you how much it will cost to meet that threat. Then, if you come back and say "Aha, I did not mean that, I meant suppose there are twice as many soldiers or terrorists." Then, of course, the defense will be inadequate.

Therefore, it seems to me that it behooves all of us to be careful when we criticize the security installations at any particular place because it was designed for a certain threat, at a certain time, with a certain level of funding, and it cannot meet an infinitely variable postulated threat.

Senator WARNER. But I think it is important that these two Departments of our Government have a reasonable parallel in the application of all of the available technology. That is our function.

Dr. DACEY. I agree with you completely. It certainly does not matter if a terrorist seizes a weapon, whether he seizes it from the DOE or the DOD.

If Dr. Wagner is still here, I am sure he would be glad to speak to that. I think he is more concerned about this particular matter than anyone else at DOD that I have encountered in recent years. And, increasingly, we at Sandia are being asked to provide technology to help the DOD to provide a comparable level of security.

The most recent example of that perhaps is the secure vault, which was designed using DNA money, which stores weapons in a very secure vault, underground, in an aircraft hangar. It provides both security against weapons seizure and also ready deployment in case war breaks out.

That is one example. There are many others where we see a tremendously increased interest on the part of the Department of Defense in the kinds of technology that we have to offer them.

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Mr. MORGAN. I just might add, Mr. Chairman, that I do believe there are different threats to the DOE weapons overseas than there are to the facilities here in the United States.

Senator WARNER. Yes; I would agree.

Having spent a good deal of time on the tragedy in Beirut, part of the problem might well have been that, while within the Department of Defense there were a variety of experts with documented recommendations, they just somehow did not filter down to the users. Therefore, I think it is incumbent upon the Department to make certain that all of the available information is available to the actual users.

Now, the extent to which they use it is something else.

Mr. MORGAN. We have a management commitment in writing from our major contractors that they will adhere to all of our safeguards and security requirements. There is no question about the management attention that has been given to this area over the past few years.

I believe that we have been given absolutely super support by the Secretary in this area.

Dr. DACEY. It might also be of interest to point out that General Kelley visited Sandia shortly after the Lebanese tragedy. He received a briefing about the kind of technology that we do have, and some highly classified programs for the Marines have been started now. So, certainly all of us hope to do the best possible job that we can in using security technology.

INERTIAL CONFINEMENT FUSION

Senator WARNER. The inertial confinement fusion program seems to be on the verge of bankruptcy this year. How much has been spent so far on this program? Particularly, how much has been spent on facilities?

Mr. MORGAN. Mr. Chairman, I must say that in the fiscal year 1985 budget that we have proposed to you, the number for operating funds is down from $145 million in fiscal year 1984 to $125 million in fiscal year 1985. In other words, that program did receive a cut from fiscal year 1984 to fiscal year 1985.

I believe the Holifield tables will show that the Department of Energy—and this has been given in earlier testimony—had requested $145 million in 1985. This would allow us to operate the Antares machine for the full year and would allow us to operate Nova on a two-shift basis rather than the one-shift that is in the current budget. That area, Mr. Chairman, has been cut.

Senator WARNER. Would the lab directors care to comment?

Dr. KERR. In the case of Los Alamos, the effect of the present budget would be to curtail the operations of the Antares facility at mid-fiscal 1985 and would result in the subsequent loss of about 125 people.

The original request of the Department of Energy, as Secretary Morgan pointed out, would have permitted the operation of that facility for the full year and the retention of the people.

Dr. BATZEL. We share a common problem at Livermore. Our plans and staffing included operation of the facility on a two-shift basis, which is the optimum way to run the facility. We see a

number of opportunities for experimentation which will help us in the elaboration of some of the physics details associated, for example, with the x-ray laser.

The lack of support will delay that kind of effort.

Dr. DACEY. As we said earlier, the program at Sandia is multipurpose. So I think in terms of direct effect, these cuts will not affect us as much as perhaps the other laboratories. It will, however, set back our participation with the other laboratories as far as the nuclear physics elements are concerned. For the actual fabrication and science that goes into making the pellets, rather than the machine which implodes the pellets, we look to Los Alamos and Livermore for that kind of work. It is a cooperative enterprise. To the extent that they stop doing it, it will affect our program very seriously, of course.

Senator WARNER. That is important.

NUCLEAR TEST MORATORIUM

Gentlemen, the first panel was asked to comment on the effect of a hypothetical moratorium on testing, from roughly January 1985, for 6 months into that year. Would you care to give me just an overview of the impact of that on your programs, and then, for the record, make a more complete answer.

[Letters to Senator Warner: Letter from Dr. Kerr dated April 13, 1984; letter from Dr. Batzel dated April 2, 1984.]

LOS ALAMOS NATIONAL LABORATORY,
Los Alamos, NM, April 13, 1984.

Hon. JOHN W. WARNER,
Chairman, Subcommittee on Strategic and Theater Nuclear Forces,
Washington, DC.

DEAR SENATOR WARNER: The development of a stable, peaceful relationship with the Soviet Union and a mutual reduction in the number of nuclear weapons and the threat of nuclear war are goals which all Americans share. Progress toward these goals would be assisted, I believe, by the negotiation of carefully crafted, unambiguous arms control agreements.

The differences in the principles and objectives of our societies are large. Agreements between the United States and the Soviet Union that rely heavily on trust and good will, or on confidence that both parties have similar interests, have more often than not generated distrust, fear, and even increases in armaments, rather than any long term amelioration of relations. But by negotiating meaningful treaties that can be verified with confidence, we might begin to create the conditions that can lead to improved relations and to secure arms reductions. A moratorium on nuclear testing would not be such an agreement in itself, and would not be likely to lead to successful nuclear arms control.

We should not forget that one of the most forceful demonstrations of the unfortunate consequences that can follow from imprecise arms control arrangements was itself a moratorium on nuclear testing—that which the U.S. and the Soviet Union entered voluntarily, and without verification measures or negotiated agreement, in 1958. That moratorium was broken by the Soviet Union in 1961, when it began a large, secretly prepared nuclear test series. On March 2, 1962, President Kennedy announced his decision that the U.S. must resume nuclear testing. A failure to do so, he said, would have indicated to the Soviets not good will, but a failure of will. Kennedy drew lessons from that failed moratorium that we must remember:

"(The Soviet Union) could well be encouraged by such signs of weakness to seek another period of no testing without controls—another opportunity for stifling our progress while secretly preparing . . . for the new test series that might alter the balance of power. With such a one-sided advantage, why would they change their strategy, or refrain from testing, merely because we refrained? Why would they want to halt their drive to surpass us in nuclear technology? And why would they ever consider accepting a true test ban or mutual disarmament?"

Demonstrations of American good will in seeking arms control proved not to be enough. We concluded that only demonstrations of America's determination to protect itself and its allies—while seeking genuine, verifiable, and constructive arms control—offered hope for progress toward improved relations with such a state as the Soviet Union.

Another moratorium on nuclear testing, even if only for a six-month period, would not appear to be productive of these ends. A moratorium would not move us closer to resolving those verification problems which have been so intractable. Even a limited moratorium might create the false and potentially dangerous impression that a comprehensive test ban could be verified. And the belief that a moratorium for a limited period of time would create good will and momentum to achieve a negotiated agreement is contradicted by history. As President Kennedy concluded, "We know enough about broken negotiations, secret preparations and the advantages gained from a long test series never to offer again an uninspected moratorium." But we know now that even an inspected moratorium would not give us confidence that the ban was being observed; comprehensive and reliable verification procedures have remained elusive through the decades of test ban proposals that have followed the 1958 moratorium.

We also must confirm another of President Kennedy's judgments on nuclear testing and test bans: a comprehensive test ban, by itself, is an unsatisfactory form of arms control. Like him we are dedicated to reducing the risk of nuclear war. But a test ban is only one step in that direction, and is not only useless but actually may be dangerous if not accompanied by complementary arms control measures. "Until mankind has banished both war and its instruments of destruction," Kennedy said, "the United States must maintain an effective quantity and quality of nuclear weapons . . . Only through such strength can we be certain of deterring a nuclear strike, or an overwhelming ground attack, upon our forces and allies."

A moratorium or test ban would gradually, unpredictably, and unequally reduce our ability to rely, with confidence, on our nuclear forces. Without substantial concurrent progress toward banishing war and our reliance on nuclear deterrence, this reduction in confidence in the nuclear forces would weaken our ability to sustain peace and freedom. Concerns with the effects on our deterrent of a test moratorium or ban were illustrated when the U.S. resumed testing in 1962. Not only had the Soviet Union greatly improved its own nuclear technology and gained unprecedented insight into nuclear effects, but some U.S. weapons had developed serious faults.

The two nuclear weapon design laboratories established procedures to approve any alterations to nuclear weapons entering the stockpile during the moratorium. Under these procedures a change to improve safety was made to one weapon system. When this modified weapon was tested after the moratorium, its performance was a small fraction of the anticipated yield. As this case showed, even the best human judgment applied to nuclear weapon design and performance, without actual tests, sometimes fails. Some argue that the uncertainty this introduces is valuable, since it may decrease the willingness of either superpower to rely on nuclear weapons. However, for many years our security and that of our allies must continue to depend on the deterrent effect of our nuclear weapons. Such uncertainty can only undermine our security. As President Reagan noted in his April 6, 1984, speech at the Center for Strategic and International Studies. "Too many forget John Kennedy's warning that only when our arms are certain beyond doubt can we be certain beyond doubt they will never be used."

Issues that affect our nuclear deterrent must be approached with care, foresight, and an appreciation of hard won lessons of history. We cannot afford mistakes. A six-month moratorium on nuclear testing would not improve our security. It would be far more constructive, in this period of strained relations with the Soviet Union, to seek agreements on crisis management aimed at reducing the risk of nuclear war. These might be crafted in a manner which would not raise issues of verification. Success in this area might then lead to possibilities of further agreements to restrain deployment, production and ultimately testing of nuclear weapons systems.

Sincerely,

DONALD M. KERR,
Director.

LAWRENCE LIVERMORE NATIONAL LABORATORY,
April 2, 1984.

Hon. Senator JOHN W. WARNER,
Chairman, Subcommittee on Strategic and Theater Nuclear Forces,
Washington, DC.

DEAR SENATOR WARNER: A six-month moratorium on nuclear testing is generally proposed in the context of a more general and long-term comprehensive test ban (CTB), or as part of a total Freeze on the development of new nuclear weapon systems. I firmly believe that as long as our national security interests depend on the deterrence of war with nuclear forces, neither a CTB nor a Nuclear Freeze is in the national interest.

For the last fifteen years the Soviets have undertaken an extensive modernization program, while our nuclear deterrent force has aged. Our forces are in need of modernization for improvements in safety, security, survivability, and effectiveness. A CTB would prevent these needed improvements and severely impact the development of new weapon systems vital to our national security.

In addition, a CTB should be considered in the total context of U.S. arms control objectives. The START proposal we have made in Geneva allows for the modernization needed to achieve a more survivable deterrent, while at the same time calling for substantial force reductions. It would be most unwise to enter into a CTB until we see what can be accomplished in START. START could produce an agreement that would lead to a much more stable world situation.

Other important reasons against a CTB have been advanced during past debates and remain valid today. These reasons are not concerned with individual weapon systems but deal with the supporting base of our nuclear weapon technology. Nuclear weapons are complex mechanisms, and of necessity, are made of highly chemically reactive materials. Because of these inherent characteristics, it has been found over the years that changes have occurred in stockpiled weapons which bring to question whether a weapon will perform as designed. Today we have procedures which can cope with and correct these faults as they occur. These procedures rely on skilled personnel and on some occasions, the need to carry out a nuclear test. Under a CTB we could no longer do such tests. Under a CTB, we would lose our skills and expertise. Weapon design experts would inevitably leave the weapons program because they could not verify their theoretical ideas with experiments. Those who stayed would gradually lose their sharpness. I have no doubt that a CTB would lead to the loss of expertise and in turn to the loss in the reliability and confidence in our nuclear weapon systems and deterrent capability. Whether these considerations would apply to the Soviets, I do not know. There are arguments on both sides of the issue. But either way, taking a path which could lead to grave doubts about the reliability of our deterrent appears to me a prescription for political instability, and possibly, disaster.

My colleague, Donald Kerr, has already expressed a serious reservation about an uninspected moratorium, the same reservation that was so eloquently stated in President Kennedy's 1961 speech when the Soviets broke the test moratorium which our country was observing at that time. What was true then is still true now.

In summary, a six-month moratorium has the features of a dangerous and ineffective form of arms control. It is the first step towards a CTB which is not in our national security interests. Even if a CTB were in our interests, a moratorium would create a negotiating atmosphere which would surrender the incentives that are needed to deal effectively with the Soviets.

Sincerely,

ROGER E. BATZEL,
Director.

Dr. KERR. Mr. Chairman, it would be a pleasure to give you extended views for the record. But I might look at a bit of history in answering your question right now and remind you of the words that President Kennedy spoke on March 2, 1962 to this very point. I will quote:

> We know enough now about broken negotiations, secret preparations, and the advantages gained from a long test series never to offer again an uninspected moratorium. Some may urge us to try again, keeping our preparations to test in a constant stage of readiness. But, in actual practice, particularly in a society of free choice, we cannot keep top flight scientists concentrating on the preparation of an experiment which may or may not take place on an uncertain date in the future. Nor can large technical laboratories be kept fully alert on a standby basis, waiting for some other nation to break an agreement. This is not merely difficult or inconvenient. We have explored this alternative thoroughly and found it impossible of execution.

Senator WARNER. For fear that someone might misinterpret the Chair's proponding of these questions, I am preparing myself and those members of the committee who share my views for anything that might be brought up on the floor.

I think that is a most notable historic quote by our former President. It bears directly on this issue.

Dr. BATZEL. I believe it does. Having worked through that particular period, and having seen the extent of the Soviet execution of their test program, and having seen the effect of the moratorium on the Livermore Laboratory to include the loss of good people and the loss of talent, I think the consequences of such a step could be quite significant and serious.

Dr. DACEY. I would only say that I believe most proponents of test bans are proposing to stop the testing of nuclear weapons whereas, to some extent, from an engineering standpoint, that is not the issue. We have many nuclear weapons around today, and if we were to want to adapt them to new kinds of delivery systems, we would find some way of doing that. It is backwards, in my mind, to try to stop the constant search for new, relevant knowledge, as applied to these problems.

In the long run, the less you know, the greater the risk. No one was ever killed by an atomic test. It is a kind of foolishness, it seems to me, to try to start at the level of understanding, rather than at the level of use. So, I think a test ban is a very bad thing for this country.

Senator WARNER. Are there any other comments?

Mr. MORGAN. I just might correct the record.

Unfortunately, a REECO technician did die from injuries suffered in a recent test at the Nevada test site, where we had a subsidence in the ground above where the test was conducted, and the people were in a reentry process at the time, Mr. Chairman. It was not radiation. It was from the subsidence.

Senator WARNER. Did anyone have a further comment?

Dr. KERR. Mr. Chairman, I would just add one further point.

I think the reason we all answered in a philosophical mode is, in terms of direct damage, that is dollars and cents, a 6-month moratorium is very hard to argue about. That is why we all focused, as did President Kennedy, in his remarks, on these more subjective and qualitative things that have to do with the spirit and quality of the program that we try to carry out for the country. That is where the damage would be done.

INCREASED NEED FOR VERIFICATION

Senator WARNER. We all have to hold out some hope that there is a way to relieve world tensions and subside the ever-constant arms race that we seem to be caught up in.

I must say, in the years that I have been involved, though not to the detailed extent that you have, but for many years in the Department of Navy and now in the Senate, this year has probably been the most revealing to me in terms of the long-term threat.

I say this because in years past, as I analyzed it, there were the three basic systems: that at sea, which is clearly definable; that on the ground, the land-based system; and the air system. [Deleted.]

I don't know the answers, but it concerns me. I try to be compassionate and understanding with the growing public concern.

If you have any thoughts, I would appreciate hearing them.

Do you agree with me, as we proceed toward a greater dispersal and mobility, that there is a greater difficulty in verification?

Dr. BATZEL. I think certainly there is a greater difficulty in terms of verification. I share the view that going away from the large MIRV'ed systems to singles means that this takes away at least part of the advantage of a first strike. It depends on how well you can count the numbers. If the uncertainty in your counting is such that you can afford to miss a significant fraction, then perhaps the counting situation does not get that bad. But I don't know.

Senator WARNER. Does anyone else have a comment?

Dr. KERR. Yes.

I think there is a point that Dr. Batzel's remark brings to mind.

We have relied, because of the dependence on ICBM's in fixed locations and submarines which can be counted as they are constructed, on counting.

I think a further step in verification is going to have to recognize that these new, more survivable systems, survivable because of their mobility, do not admit easily to counting. We are going to have to measure something else, because, in the end, verification does, in fact, mean measuring something.

In the past, there have been suggestions, not accepted by this country because at the time they were not suggestions that appeared useful to us, that we should use upstream from counting the objects and should worry about the control of the materials that go into the weapons themselves.

Another way to say it is that you count the production reactors, and your onsite verification may be the measurement of what is going on inside that reactor. You get a handle on it by saying all right, we will control our stockpile of material and we will not try to dictate how you apply it to your military forces.

One might be able to achieve that if, in fact, the Soviet interest in opening their civil nuclear facilities to the International Atomic Energy Agency inspectors could be extended in the future to their military facilities.

That would give you the start of an approach toward the end that you seek.

Dr. DACEY. I would add only one more thing to that. If, in fact, we get to the point, as you I think correctly surmise, where a mere counting of weapons by national means will no longer be feasible, then some other approach will be necessary. One, perhaps, is the monitoring of materials; another may be the agreed destruction of weapons—you destroy one and I will destroy one and we will watch each other do it.

There is no perfect answer, obviously, to this, except reaching a stage in the world where we can, in fact, trust each other. As long as we are trying to outguess the possible ways in which they can spoof us or we can spoof them, there is a race between technical verification, which is always imperfect, and the kinds of unknowns, which make us produce an overly conservative stockpile.

The only way out, it seems to me, over time is a long series of careful negotiations on every aspect of the problem.

Senator WARNER. I would just make one more observation before I close out the subject.

As you go into this proliferated dispersal accompanied by mobility, what troubles me is that you will have isolated railcars, trucks, whatever may be carrying these weapons. Consider this against a background of a submarine making a tactical error coming up

under our carrier, as just happened, or the shootdown of KAL 007. Here is some second lieutenant with one of these missiles way out in Siberia somewhere, with a bunch of youngsters—I don't know what the command and control is going to be—that is what worries me.

TERRORIST ACTIVITY

Turning now to terrorist activity, as you well know, the distinguished Senator from Georgia is quite interested, as am I and other Senators, in a variety of ways to deal with this problem. But, fundamental to this terrorist threat in the nuclear world is their capability to acquire the knowledge to build a crude weapon.

Where are we in the historical chain of events by which that might occur?

Dr. KERR. The knowledge that supercritical masses of fissile material could explode was known in 1945 and cannot be reversed. The fundamental physics that underlay that explosion were worked out in the first part of the century, and, essentially, all that was done in the 1940's was the engineering, the hands-on knowhow, to take that theoretical and experimental laboratory knowledge and convert it into a military weapon.

Any nation that wishes to have the capability can have it, if it can afford it.

Terrorist groups have to be ranked just as the military capacity of nations has to be ranked. Sufficiently well financed and given access to material and time and individuals with knowhow, because theoretical knowledge by itself is insufficient, clearly it gives you the prospect at some time of a subnational group with a weapons capability.

You also have to think through at the same time what could they possibly want to do with it, in the sense that our very highly interdependent and organized industrial society can be threatened in ways very less provocative in a sense than with weapons of mass destruction but perhaps equal to gaining the advantage the terrorist group might wish to have. I think of simple things, such as our water supply and the weaknesses that have been perceived in our ability to deliver natural gas or electricity to regions of the country from time to time.

So, I think at times we delude ourselves with the view that terrorists, in fact, seek to gain a nuclear capability when their objectives might be gained by much simpler and direct means that would be equally damaging to our country.

Senator WARNER. Senator Nunn used the hypothetical situation that we have some 5,000 F-4's built in this Nation now scattered throughout the world and one could be obtained relatively simply, the markings of one of our Mediterranean carriers put on it, and it could be directed right into the Soviet Union to try to precipitate confrontation.

Again, it is predicated on their obtaining or constructing a very crude weapon.

Have we moved any closer to that hypothetical situation?

Dr. BATZEL. The fundamental requirement is the nuclear material. The knowledge is there. But, as Dr. Kerr pointed out, it still takes a pretty sophisticated capability in order to put something together which has a reasonable chance of working. It is not something that people are going to do in their garages. It is going to take a well integrated effort. I think the area that worries me most

is that countries which may want to spawn such activities will have available nuclear materials, nuclear weapons technology, and will provide that kind of capability to a terrorist group.

Dr. DACEY. The matter that concerns me at least as much as a terrorist group obtaining a nuclear weapon is whether or not in all of our arms negotiating apparatus we have given adequate attention to deescalation. We have concerned ourselves a great deal with deterrence and with trying to maintain equal forces. But I do not believe that we have put an adequate attention into prearranged scenarios of what we would do vis-a-vis the Russians or what they would do if, in fact, one such weapon were to go off. We do have a red telephone, but I think we ought to pay more attention to what we should do when the first bomb drops to assure that there are not two, and if two drop, that there are not three. The assumption of inevitable escalation, that is, that the first nuclear detonation means the elimination of the human race, is the most immoral situation that I can imagine by refusing to think this problem through.

Senator WARNER. I concur in that.

I will do whatever I can, as will other Members of the Senate, to ensure that we establish better communications.

Are there any other comments on this point? Philosophical though it may be, it is helpful to know and have in the record expressions from each of you because I know personally of your concern.

We have had long discussions together privately on this subject.

So, in substance and in conclusion, in 1984, the reality of a terrorist or subnational group being able to manufacture a crude bomb or weapon has not moved any further than it was in 1983, or 1982, or 1981, absent, as you very wisely point out, some collusive effort on the part of a nation which has the potential to manufacture the material?

Dr. KERR. [Nods affirmatively.]

Mr. MORGAN. [Nods affirmatively.]

Senator WARNER. So, that line has remained basically flat.

I have one last comment.

[Deleted.]

Are there any questions from the staff?

[No response.]

Gentlemen, I thank you for your patience. You have provided a very adequate record to go to the floor and make a strong case in support of the administration's request.

The record will remain open for a period of 48 hours, for questions for the record.

Thank you all very much.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

Senator WARNER. The Nuclear Waste Policy Act of 1982 [Section 8(b)] requires the President to evaluate the use of commercial repositories for disposal of high-level waste resulting from atomic energy defense activities. What is the status of that evaluation?

Mr. MORGAN. The Assistant Secretary for Defense Programs has been assigned the responsibility to prepare, in conjunction with the Office of Civilian Radioactive Waste Management, a study required by Section 8 of the Nuclear Waste Policy Act of 1982, evaluating the use of disposal capacity at one or more civilian repositiories for the disposal of defense high-level waste. This effort is well underway within the Department. We anticipate no problems in providing the results of this study to the President as the basis for the evaluation he is required to conduct by January 1985.

DEFENSE ENERGY SUPPLY SYSTEMS

Senator WARNER. Defense Energy Supply Systems need to be modernized, made secure, and hardened relative to current and future tactical and strategic threats. What is DOE doing to support DOD in their effort to reduce the vulnerability of mission-oriented power supplies?

Mr. MORGAN. Under the Department's Defense Energy Programs there are several somewhat related RD&D efforts being developed jointly with the DOD that are geared to meeting these requirements:

(a) DOE is currently evaluating a Defense Terrestrial Reactor, DTR, for the purpose of providing secure and hardened power to defense bases. DOE is requesting reprogramming of $2 million in fiscal year 1984 to conduct a conceptual design and to help DOD define its needs in technical terms to determine whether the result is something that can be provided by private industry. We plan to have DOD fund whatever work is finally done so that the project remains focussed on DOD's needs. Thus, we have not requested funds in DOE to continue the development of reactors for DOD in 1985.

(b) Tritium self-powered radioluminescent airfield lights and markers, with a half-life of 12 years, are 100 percent reliable; require no maintenance; and lightweight, easily deployed; have no heat signature; and are immune to temperature and whether conditions.

(c) A high-powered, 500 watt, strontium-90 radioisotope thermoelectric generator, RTG, is being developed using off-the-shelf proven lead telluride technology with over a million hours of performance without failure. The power source will be provided to DOD for system demonstrating testing. It is anticipated that the RTG will provide uninterrupted stable DC power for over 10 years continuous operation. One prime application being considered is for the power supply for the emergency shelter in the Short Range Radar stations of the North Warning System, DEW Line. The emergency shelter will be used by personnel during maintenance of the station. The RTG will provide 100 percent reliable heat and power to support their survival.

(d) DOE has evaluated four power source, i.e., fuel cells, diesel electric generators, passive thermoelectric nuclear reactors, and organic rankine power systems, as potential prime source for the modernization of the North Warning System.

Senator WARNER. What is the status of the DOE efforts in evaluating power systems for modernization of the North Warning System?

Mr. MORGAN. A draft report, LA-Draft-MS, Vol I and II, "North Warning System Alternative Power Supply Assessment," has just been issued by LANL and is being reviewed by DOE and DOD. The report concludes: ". . . Because of this elimination of the fuel logistics problem and the inherent high reliability of the reactor concept proposed, it was concluded that the reactor option is the most promising alternative in meeting the stated objectives for the unattended Short Range Radar (SRR) sites. A development plan to design, fabricate, and test the reactor concept was presented. Institutional issues to be addressed by the Air Force and DOE were identified. . . ."

HIGH-LEVEL WASTE

Senator WARNER. EPA proposed Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Radioactive Wastes (40 CFR 191), on December 29, 1982. Has DOE been tracking development of the final standard? Do you expect that WIPP, SR, RL, and ID will be able to comply with the standards based on their management and disposal plans?

Mr. MORGAN. DOE has been following with great interest the development of EPA's 40 CFR 191, which is scheduled for final promulgation some time this spring. DOE has four major issues with the latest version of the standard as follows:

While acknowledging the problem in the preamble, EPA does not make adjustments in its HLW definition for the fact that it will cause NRC to assign, through its definition of HLW, the applicability of 40 CFR 191 to atomic energy defense activities for which NRC does not have jurisdiction. We recommend that the definition read as follows: "(f) 'High level radioactive wastes,' as used in this part, shall have the same meaning as in 10 CFR 60 for materials produced by activities regulated by the Commission, and as defined by the Department for atomic energy defense activities."

If EPA is concerned that DOE might exclude material from coverage under part 191, we would not disagree with an Assurance Requirement that read as follows: "DOE may not remove from applicability of this part materials defined as HLW by the NRC."

Section 191.17, the provisions providing for Alternative Provisions for Disposal of Existing High-Level Radioactive Wastes is not a particularly useful provision unless a full-scale rulemaking can be avoided. The part should contain a variance procedure whereby equivalent alternate health and environmental protection could be demonstrated by DOE, and EPA could make a variance determination on the basis of that demonstration and with full public review, in something less procedurally burdensome than rulemaking.

With regard to Subpart A of part 191, one option we have begun to explore is for an MOU to be developed with EPA rather than having Subpart A applicable to DOE activities.

A new provision of the standard appeared in the latest version. It sets limits for contamination of groundwater with no analysis to support environmental benefit or achievability. When combined with the definition of accessible environment, which is set at 2 kilometers horizontally from the waste in the disposal system, the limits become unreasonably restrictive. Groundwater contamination in the immediate vicinity of a repository system should be of concern only if it can influence distant water supplies that have some realistic probability of being tapped.

It is expected that the reference plans for Savannah River and Idaho, as well as the demonstration in WIPP, as described in the Defense Waste Management Plan (DOE/DP-0015) will be able to comply with 40 CFR 191 provided it properly takes into account the concerns described above. However, in the reference plan for Hanford, some of the older previously designated high-level waste would be stabilized in place because the hazard of retrieving and treating the waste appears to be greater than the hazard eliminated. This method would also provide a significant cost saving but would require a separate rulemaking by EPA according to the lastest version of the standard.

PHYSICAL FITNESS STANDARDS

Senator WARNER. Why were physical fitness standards issued by DOE for their security forces?

Mr. MORGAN. The DOE recognized that protective force personnel must be physically capable of performing all necessary actions required to ensure adequate protection of our facilities. Members of DOE protective forces are guarding some of the most sensitive materials and facilities in the Nation. The DOE's nuclear weapons production and testing complex is a unique and irreplaceable national resource. Further, the potential consequences of a successful terrorist act involving nuclear materials requires us to take all steps necessary to prevent such an occurrence.

An important component of the protection afforded these national security assets is the ability of our guard forces to contain, and, if necessary, defeat a force of armed terrorists. The tasks required were carefully analyzed from the perspective of physical fitness necessary to successfully complete them. As one might expect, response to an armed attack requires a good deal of endurance, strength, and agility. We believe that our physical fitness standards provide a valid and job-related measure of the minimum physical fitness required for the DOE security mission.

Senator WARNER. What is the current status of these standards?

Mr. MORGAN. On March 7, 1984, the United States District Court, Eastern District of Washington, Judge Quackenbush presiding, ruled against the DOE in the lawsuit brought by the International Guards Union of America. The court specifically enjoins the DOE from enforcing the standards that were issued on December 6, 1982. However, the court dismissed the union's claim that the standards were discriminatory with regards to age and sex. This decision was based on the court's finding that DOE had not gone through proper rulemaking procedures as required by the Administrative Procedures Act (APA). The specific APA citations required Federal agencies to provide notice, opportunity for meaningful comment, and formal publications.

DOE is now in the process of developing a submission for formal rulemaking in order that we may proceed to implement the physical fitness standards pursuant to the APA.

DEADLY FORCE

Senator WARNER. The Department has developed an internal policy on the use of deadly force to prevent the theft or sabotage of special nuclear material or related facilities. Would you explain the circumstances under which deadly force may be used?

Mr. MORGAN. Deadly force is authorized only as a last resort if lesser force will not suffice to prevent the successful completion of an act of theft or sabotage. DOE's policy guidance to its protective force personnel strictly limits deadly force, even as a last resort, to only three situations: first, to protect innocent persons from death or grievous harm; second, to prevent the theft, sabotage, or unauthorized control of nuclear weapons and devices or special nuclear material (SNM); and third, to prevent an act of sabotage to SNM-related facilities and activities which could harm the public.

Senator WARNER. Have you encountered any difficulties in implementing the deadly force policy throughout the Department's complex?

Mr. MORGAN. The only significant difficulty we have encountered in implementing this policy has been the perception that some state laws are in conflict with our policy. However, our policy on the use of deadly force was developed with the restrictions imposed by the various types of state penal codes very much in mind. We believe that the imminent theft of SNM poses sufficient consequence for harm to the public health and safety as to warrant the use of deadly force, if necessary, to prevent a successful act. Our position is that the inherent restrictions on the use of deadly force contained in our policy, combined with the federal law to protect nuclear weapons and SNM, are sufficient to cover any differences between state and Federal law.

STATE TAXES

Senator WARNER. How much money is in the Weapons Activities account for state taxes for fiscal year 1985?

Mr. MORGAN. The fiscal year 1985 state tax liability for Weapons Activities associated with the new taxes imposed by the states of Colorado, Missouri, Nevada, New Mexico, and Ohio, for which the fiscal year 1984 tax supplemental of $37 million was requested, is expected to be about $32.0 million. I would like to insert a table for the record to provide details regarding the state tax liability issue.

FISCAL YEAR 1985 STATE TAX LIABILITIES

[Dollars in millions]

State, site and type tax	Weapons Activities Tax Liabilities	
	Research, development, and testing	Production and surveillance
Colorado/Rocky Flats Plant—A 4 percent sales and use tax imposed on the purchase of supplies or the use of services not related to product	0	$1.4
Missouri/Bendix Plant—A 6.2 percent sales tax and a 4.1 percent use tax. Sales tax is applied to all capital equipment purchases and disposal sales of excess property. The use tax is applied to all supplies and services not related to product and to all lease and rental agreements	0	2.5
Ohio/Mound facility—A 6 percent sales and use tax is applied to all supplies and services not related to product, all leases and rental agreements, and all construction activities done by Monsanto personnel	0	4.8
New Mexico/Sandia Labs—A 4 to 4.5 percent gross receipts/compensating use tax. Exclusions to gross receipts tax include travel and services performed outside New Mexico	$15.6	3.3
Nevada/NTS—A 3.75 percent sales/use tax on material either purchased in the state (sales tax) or purchased outside Nevada for use within the state (use tax)	4.4	0
Total fiscal year 1985 tax liabilities	20.0	12.0

STRATEGIC DEFENSE INITIATIVE FUNDING

Senator WARNER. Your budget narrative states that most of the growth in your research, development, and testing fiscal year 1985 budget request is for work associated with the President's initiative on strategic defense. Please provide a breakout showing all funds budgeted for this effort.

Mr. MORGAN. Most of the real growth after inflation in the fiscal year 1985 research, development, and testing budget request is for the Strategic Defense Initiative. The fiscal year 1985 estimate is for about $210 million. About $171 million will be used to research concepts using nuclear explosions to drive directed energy weapons. [Deleted].

SPECIAL ISOTOPE SEPARATION PROGRAM

Senator WARNER. How will the Atomic Vapor Laser Isotope Separation (AVLIS) process be used to support the DOE defense programs, and is the funding sufficient to support the necessary schedule?

Mr. MORGAN. When fully developed, the AVLIS process will separate a number of undesirable isotopes from DOE-owned nonweapon-grade plutonium to produce weapon-grade plutonium for the nuclear weapons program. Plutonium cleaned up by AVLIS can be made available on the schedule necessary to support weapons requirements. A follow-on application for the AVLIS process will be the reduction of the radiation levels associated with existing weapon-grade material. Such a reduction may be needed to meet future, potentially more stringent exposure limits for personnel who manufacture or handle nuclear weapons.

The requested funding is sufficient to support operation of the full-scale AVLIS process demonstration system at the Lawrence Livermore National Laboratory by fiscal year 1987. The reduced funding level delays the option to operate a prototype at Richland by 1 year to fiscal year 1989. This will allow time for a technical review of the program by DOE and the Office of Science and Technology Policy.

Senator WARNER. What is the objective of the DOE and the Office of Science and Technology Policy review of the plutonium laser isotope separation program?

Mr. MORGAN. Significant technical milestones have been achieved in plutonium special isotope separation (SIS) technology since the last major review in fiscal year 1982. Accordingly, during fiscal year 1984 there will be a joint Department of Energy and Office of Science and Technology Policy independent technical review of the status of the plutonium SIS program. SIS candidate processes considered will be the Atomic Vapor Laser Isotope Separation process, being developed by the Lawrence Livermore National Laboratory, and the Molecular Laser Isotope Separation process under development at the Los Alamos National Laboratory. The principal objectives of this review will be to determine the technical status of SIS research and development activities, identify any remaining major technical issues, and develop recommendations concerning any needed revisions to the currently planned program. The review will also address the need for the timing of an SIS production capability. All aspects of a complete SIS system will be considered, including laser development as well as equipment required for separation and materials handling, with the objective of establishing the technical readiness for proceeding from the process development phase into the prototype operations phase of the program. This information, together with updated analyses of plutonium supply requirements, will provide the principal basis for formulation of the fiscal year 1986 budget request for plutonium SIS activities.

MARSHALL ISLANDS

Senator WARNER. I notice that this year Department of Energy Defense Programs continues to fund new programs that are the responsibility of others. One of these that has appeared for the first time this year is a health program for the Marshall Islands to the tune of $6 million for fiscal year 1985 to carry out a plan that is the responsibility of the Department of Interior. Why is this a responsibility of the weapons program of the Department of Energy to be included in the 050 National Defense Budget category?

Mr. MORGAN. In our budget request, we are asking $6 million for the Marshall Islands and Environmental Programs. The environmental part of this request has to do with radiation studies of areas outside the Nevada Test Site. The Marshall Islands portion, $5.4 million, is a legacy of the weapons testing program. Health care and radiation monitoring programs in the Marshall Islands were begun under the direction of the Atomic Energy Commission and have continued to date. The Compact of Free Association, which is to be submitted to Congress this year together with the Section 177 Subsidiary Agreement would provide the Marshall Islands Government with funds to purchase technical assistance from U.S. agencies to aid it in incorporating in its comprehensive health care system, health care programs, services and radiation monitoring related to the U.S. Testing Program.

When the compact is effective, United States Government activities in the field of health care and radiological monitoring generally will be limited to providing technical assistance on a reimbursable basis to the Government of the Marshall Islands.

Public Law 95-134 requires the Secretary of Interior to provide, and DOE to fund, medical care and treatment of radiation injuries and illnesses to the survivors of 254 Marshallese exposed to radiation. In Public Law 96-205, Congress directed the Department of the Interior to develop and implement an integrated, comprehensive health care program for the peoples of the nuclear affected atolls of Rongelap, Utirik, Bikini, and Eniwetok. The same law directed the Department of Energy to fund this program. In the fiscal year 1984 supplemental, Defense Programs was given $4 million to begin the implementation of public Law 96-205. Department of Energy/Defense Programs and Department of Interior/Territorial and International

Affairs staff members have been working together since December 1983 on developing a plan. Department of Interior has promised the House Subcommittee on Interior and Insular Affairs a draft health care plan by May 1984.

While it may appear that health care and radiation monitoring activities such as our Marshall Islands efforts are not defense-related, there are members of Congress who think that because the weapons program caused the problems in the Marshalls, we should fund these activities.

COMMUNITY ASSISTANCE PROGRAM

Senator WARNER. I note that the weapons activities budget this year contains all of the so-called "Community Assistance Program" funds for the Los Alamos, New Mexico, and Oak Ridge, Tennessee, communities. I understand that the State of New Mexico recently received hundreds of millions of dollars in back taxes. Both Oak Ridge and Los Alamos are mature communities. What justification is there for conducting these community assistance programs?

Mr. MORGAN. The statutory purpose of the assistance is to compensate the Los Alamos and Oak Ridge communities for their lack of an industrial or commercial tax base which normally funds school systems, utilities, and other facilities normally provided by the local government.

Senator WARNER. If there is a justification, why should the defense activities bear the entire cost?

Mr. MORGAN. The primary mission of the Los Alamos National Laboratory and the Oak Ridge complex is to support the Department of Energy's Defense Programs activities. It is important programmatically that we maintain good relations with the local communities and assure that a good community environment is maintained to attract top quality technical and administrative personnel to these areas. These assistance payments are important elements in this effort.

Senator WARNER. Does the Department intend to reexamine the need for these programs in the future?

Mr. MORGAN. Yes. The agreements under which the City of Oak Ridge and Roane and Anderson Counties currently receive assistance payments expire on September 30, 1984. In light of this, the Department of Energy engaged SRI, International to reevaluate the Community Assistance Program in the Oak Ridge area and to identify alternatives available to the Department. We are now in the process of analyzing all available data and should be in a position to make a recommendation to Congress shortly. Although the contract for Los Alamos County does not expire until June 30, 1986, the Department of Energy is evaluating the impact of the New Mexico Gross Receipts Tax as it applies to the Zia Corporation in terms of modifying assistance payments to Los Alamos County to reflect additional revenues generated by the tax on the Zia Corporation. The Los Alamos School Board will not benefit from these taxes.

Y-12 ENVIRONMENTAL PROBLEMS

Senator WARNER. There has been some recent publicity about environmental problems at the Y-12 Plant, and there have been hearings by House Science and Technology Subcommittees on mercury contamination. Would you briefly summarize the environmental problems and the necessary corrective action?

Mr. MORGAN. The Y-12 Plant has a number of industrial and radioactive waste problems. Construction projects already in progress will alleviate several environmental problems at the Y-12 Plant; specifically, by eliminating particulate emissions from the steam plant, by reducing hydrogen fluoride effluents from process gases released to the atmosphere, and by treating waste streams generated in production processses, previously released to seepage ponds.

The Y-12 Plant has been cited by the State of Tennessee and the Environmental Protection Agency for noncompliance with provisions of the Clear Water Act and the Resource, Conservation, and Recovery Act. Subsequently, the Department of Energy, the Environmental Protection Agency, and the State of Tennessee executed a Memorandum of Understanding delineating immediate actions and requirements for planning and conducting future remedial programs to achieve compliance.

DEFENSE WASTE PROCESSING FACILITY

Senator WARNER. What are the plans for the Defense Waste Processing Facility (DWPF) in fiscal year 1985?

Mr. MORGAN. In fiscal year 1985 we will: continue the design to about 80 percent complete; continue construction of the main processing building; begin construction

of support facilities and facilities to dispose of decontaminated salt solution from high-level waste processing; continue procurement of essential materials and equipment such as rebar, piping, valves, electrical, heating, and ventilation equipment, as well as process equipment for canister welding and decontamination; process control, feed handling, remote viewing, radiation monitoring, etc.; and continue testing critical equipment and systems to insure DWPF will operate with minimum problems. All of these efforts are necessary for operation of the DWPF in 1989 as planned.

Senator WARNER. What changes have caused the total estimated cost for the DWPF to be reduced from $910 million last year to $870 million this year?

Mr. MORGAN. The total estimated cost of $870 million is based on a newly revised cost estimate. Escalation and contingency have been significantly reduced from the previous estimate. Additional scope has also been added to the project that was originally planned for a subsequent line item, Stage 2. These items are necessary to process the liquid and salt portion of the waste for disposal. Technical improvements have eliminated most of what was originally the Stage 2 requirements. However, the remaining items, which now make up about 10 percent of the DWPF project, are necessary to provide a complete facility to handle both sludge and salt waste. With these additions, a future Stage 2 will not be necessary. This additional scope combined with the greatly reduced escalation and contingency result in the net reduction of $40 million. We will continue to pursue opportunities to reduce the cost even further during the construction phase of the project.

HIGH-LEVEL WASTE AT HANFORD AND IDAHO

Senator WARNER. Recognizing the commitment to immobilize Savannah River high-level waste in the Defense Waste Processing Facility, what are the plans to process high-level waste at Hanford and Idaho?

Mr. MORGAN. Reference plans for the long-term management for high-level waste at Richland and Idaho are given in the Defense Waste Management Plan (DOE/DP-0015). Both plans call for immobilization of the most hazardous fraction of the waste and disposal in a geologic repository. Richland's plan calls for in-place stabilization of some previously designated high-level waste because the hazards of retrieving and treating the waste appear to be greater than the hazards eliminated. There is also a significant cost savings. Richland's plan also includes the disposal of the decontaminated salt fraction in a near surface burial ground after immobilization in grout.

WASTE ISOLATION PILOT PLANT

Senator WARNER. Is the President supporting the Waste Isolation Pilot Plant project, and how do you plan to achieve your objective of having the facility ready for operation in 1988?

Mr. MORGAN. The Administration is supporting the WIPP Project with a request for $87,500,000. This funding will assure completion of construction by December 1986 and receipt of first radioactive waste by October 1988.

During fiscal year 1983, the exploratory phase of the project was completed and a transition was made to permanent facility construction. With that transition, made on July 1, 1983, major construction contracts were allowed to proceed. These contracts include a railroad spur, water pipeline, access roads, site development, and sinking of additional shafts. The primary waste handling building will be under contract by spring 1984. Both fiscal year 1984 and fiscal year 1985 will be peak years for WIPP construction activity.

Senator WARNER. The State of New Mexico continues to raise the issue of WIPP's mission—What are you doing to resolve this concern?

Mr. MORGAN. The State has again raised the issue of WIPP's intended mission in a December 2, 1983, letter to the Secretary of Energy. In an interim response on December 29, 1983, and a final response on February 10, 1984, the Secretary committed to resolving the State's concern.

The Department's position is, and continues to be, that the WIPP mission is adequately defined in Public Law 96-164 and its legislative history: (a) R&D facility to demonstrate disposal of radioactive waste from defense activities; (b) defense transuranic waste storage, retrievable for five years, then decision to be made on permanent disposal; (c) experiments with defense HLW; and (d) HLW removed after experiments or prior to decommissioning.

We believe that this mission is further defined in the Record of Decision on our Environmental Impact Statement and in court stipulated agreements with the State. In addition, the total context of project execution to date supports DOE's com-

mitment to that mission. We are committed to further assuring the State that the Department neither seeks nor is pursuing a broader mission for WIPP. In his February 10, 1984, letter to Governor Anaya, the Secretary directed that the Albuquerque Operations Office negotiate a written agreement with the State to define the WIPP mission. This agreement would be fully consistent with PL 96-169 and its legislative history. Governor Anaya responded on March 9, 1984, that he is confident an agreement can be reached.

FRACTIONATION AND ENCAPSULATION

Senator WARNER. The budget mentions that the fractionation and encapsulation facilities at Hanford will be put into a standby status now that their mission is coming to a close, unless subsequent evaluations indicate the need to do otherwise. Is that still your plan?

Mr. MORGAN. The fractionation and encapsulation facilities have a new mission. They are located in B Plant, which will be used in separating fractions of PUREX processing wastes that are identified for geologic disposal in a Federal repository. The schedule for reactivation is coordinated with the plans for a waste vitrification facility for which a startup date of fiscal year 1992 is under consideration. These plans are subject, of course, to available funding. However, in the interim, B Plant will undergo extensive renovation and restoration. Also, additional facilities will be installed. Finally, a backlog of feed for the vitrification facility will be prepared. Thus, the period of time B Plant facilities will be completely inactive in standby service, if any, is expected to be brief.

Senator WARNER. What are your current plans for the encapsulated cesium and strontium capsules stored at Hanford?

Mr. MORGAN. All of the useful cesium-137 from prior waste reprocessing is now encapsulated and in storage at Hanford. This amounts to little more than 90 million curies. Of this amount, the Byproducts Utilization Program has committed about 20 million curies to the demonstration irradiators that Congress has authorized (e.g., Albuquerque sewage sludge, citrus, pork, and the transportable irradiator). As of March 1984, the Oak Ridge Isotope Sales Office has firm purchase requests for over 140 million curies that will require the 70 million curies remaining plus more.

As for the strontium-90, the Byproducts Utilization Program is developing a 500 watt Radioisotopic Thermoelectric Generator (RTG) that will require 7200 thermal watts or slightly more than 1 mega curie per RTG. The DOD is considering using this power supply as a reliable heat and power source for the Emergency Shelter used by repair personnel at the Short Range Radar Sites in the North Warning System. There are presently [deleted] Short Range Radar Sites planned that might then require a 500 watte RTG, which would require in total approximately 40 million curies of strontium-90. There are 35 million curies now available.

As indicated in the Defense Waste Management Plan, cesium and strontium capsules that have no further beneficial use will be placed in dry storage or disposed of in a repository.

There is an additional 70 million curies of cesium-137 and 35 million curies of strontium-90 that could be purified and separated from the current PUREX waste. Due to the cost savings that can be realized in the geologic disposal of Hanford high-level waste by separating cesium-137 from current PUREX waste, the DOE plans to separate the cesium-137. If the industrial requirement is sustained, this material can be made available to industry on a full cost recovery basis. Our current plans do not include the separation of strontium-90 from current PUREX waste.

RELATIONSHIP WITH DOE

Senator WARNER. Dr. Wagner, over the years there have been those who argued that the Atomic Energy Defense Activities should be under the control of the Defense Department. You were previously in the weapons program at Livermore Lab and now you are in the Defense Department. Do you feel that the nuclear weapons program belongs in DOD or in some agency outside of DOD?

Dr. WAGNER. As you may recall, this question was considered in some detail in 1976 during the Energy Research and Development Administration reorganization (the "Transfer Study") and again in 1980 by the Department of Defense/Department of Energy Long Range Resource Planning Group (the "Starbird Study"). Most recently, we considered the best arrangement for management of the nation's nuclear weapons activities as a major part of the Administration proposal for dismantling the Department of Energy. We considered very carefully whether moving this management under the Department of Defense would be the best approach, and we decided that retaining management outside Department of Defense would still serve

the nation best, but the management organization could be improved. Since the Congress has not elected to pursue dismantlement of the Department of Energy, program management stability is very important also, and we would not recommend a reorganization without a clearly demonstrated benefit. We are working closely and effectively with the current Department of Energy organization, and certainly we would want to cooperate in further improvements wherever possible.

Senator WARNER. Mr. Morgan, let me approach the same subject from a slightly different angle. When he first took office, President Reagan proposed to dismantle DOE. I know that the uncertainty generated by this proposal damaged DOE to some extent. Were your programs hurt? How would you characterize the top DOE management of your programs?

Mr. MORGAN. I do not believe our programs were actually hurt in any direct sense by the proposal to dismantle the Department of Energy. I say that because in all of the discussions and planning for that reorganization, it was always clear that our entire organization of Headquarters staff, Field Offices, laboratories, and all other contractor organizations on which we depend was to have been left intact. All of the current working relationships were to have remained as they were and are now. That understanding at least minimized, and may really have prevented, the uncertainties to which other programs were exposed.

There may have been some indirect difficulty in the laboratories due to uncertainty as to the fate of the nondefense-sponsored work they were doing at the time. However, it is my view that the laboratory managers did a good job of insulating their defense work from these uncertainties, minimizing any such indirect negative influences.

In answer to the second part of your question, top management in the Department is very much concerned about the successful accomplishment of our defense assignments. We definitely have the full support of the Department, from the Secretary on down, and the Secretary has the full support of the administration.

RELATIONSHIP OF DOD WITH DOE

Senator WARNER. Dr. Wagner and Mr. Morgan, let me ask you both this question. The committee staff is working on a major DOD reorganization project which Chairman Tower will bring forth at some point. Do you think consideration should be given to moving your defense programs to DOD in some sort of quasi-independent agency?

Dr. WAGNER. Certainly for completeness the committee might want to consider this option. It is one of several that has been looked at closely on three different occasions over the past eight years, and we have always found that the benefits associated with this direct management under Department of Defense, even for a quasi-independent agency, were outweighed by the penalties, particularly the sacrifice of a clearly independent second source for judgment and advice on nuclear weapons. However, a quasi-independent agency under the Department of Defense would come closer to preserving these major benefits than would full integration within the Department of Defense management structure.

Mr. MORGAN. While, as Dr. Wagner says, the committee might wish for completeness to consider again such an organizational shift, moving Defense Programs to the Defense Department in a quasi-independent agency would be very unwise. It would have several serious disadvantages without compensatory benefits. First, any substantial change would be administratively and operationally disruptive, at least in the short run. More importantly, in the long term, the valuable technical assistance we now provide to the Department of Defense, described so well by Dr. Wagner in his statement and mentioned again in his answer to your question, is made possible only by the current independence that separates the Departments of Energy and Defense. I agree with Dr. Wagner that the very important complementary role the Department of Energy plays in support of the Department of Defense in development of the Nation's nuclear weapon systems would be increasingly diminished in proportion to any reduction in independence between the two Departments.

Further, it must be appreciated that internal to the Department of Energy laboratories, the defense work benefits substantially from the non-defense research and development which now is also carried out by those organizations. Technical expertise and valuable scientific talent now flows into the weapons program from this other work. Separation of defense programs into an organization closer to the Department of Defense might have the effect of removing this civilian work from the laboratories. Even if it did not, and the laboratories were responsible to two agencies, their positions would be doubly difficult. Differing and possibly conflicting objectives, policies, priorities, management and administrative systems, and other fac-

tors would likely exist and would undermine the vitality and diminish the contributions of the laboratories.

INERTIAL CONFINEMENT FUSION

Senator WARNER. The inertial confinement fusion program seems to be on the verge of bankruptcy again this year. How much has been spent so far for this program—paticularly how much has been spent on facilities?

Mr. MORGAN. The total program expenditures through fiscal year 1985 will be $1.795 billion. This figure includes the total estimated cost through fiscal year 1985 for the three major driver facilities of $286.6 million.

Senator WARNER. How much would it cost in fiscal year 1985 to run the ICF facilities at a reasonable level of operations—a level that makes full use of these facilities for their intended purpose?

Mr. MORGAN. The President's budget that has been submitted for fiscal year 1985 provides $125 million in operating funds for the Inertial Fusion Program. This level of operating funds is adequate for single-shift operation of NOVA and six months' use of ANTARES; it will also support the final phases of the Particle Beam Fusion Accelerator-II construction in line with the schedule completion date in January 1986. However, a reduced level of experimentation will be conducted at the Lawrence Livermore National Laboratory, a minimal level of experiments at the Los Alamos National Laboratory on ANTARES, [deleted].

[Deleted.] The Department of Energy recommended $145,000,000 in operating funds for the inertial fusion program which would be an increase of $20 million.

Senator WARNER. How much have you budgeted for ICF operations for fiscal year 1985?

Mr. MORGAN. The fiscal year 1985 budget request is $125 million for operating expenses.

Senator WARNER. Should we just go ahead and terminate the ICF program?

Mr. MORGAN. The Inertial Fusion Program contributes today directly to military applications and has the potential to become a commercial source of energy in the future. The review in 1979 associated with the Foster Committee concluded that there were no "insurmountable roadblocks" for inertial fusion; nothing has changed in the intervening period to contradict that opinion. The program has made continual progress both in determining the physical laws controlling the achievement of successful inertial fusion burn, as well as in engineering the complex facilities to produce high energy beams needed to demonstrate the technical feasibility of inertial fusion.

In view of the recent program successes in both the classified and the unclassified areas of the ICF program, the Department of Energy continues to support the Inertial Fusion Program.

Senator WARNER. I get the feeling that the scientific community is divided on the wisdom of proceeding with the ICF program. Why don't you put together a panel of outside experts to give the ICF program some direction?

Mr. MORGAN. Although there may be differences of opinion concerning how best to proceed, we are unaware of any opinion in the scientific community favoring termination of the Inertial Fusion Program. For the past two years, the Inertial Fusion Program has taken its direction from the Inertial Fusion Program Plan, a comprehensive document that is reviewed annually and coordinated with all major participants in the Inertial Fusion Program and is approved by the Assistant Secretary for Defense Programs. As is common for a program of the size and complexity of the Inertial Fusion Program, there exist some differences of opinion within the greater scientific community over issues of scope, pace, and balance of the program. The Office of Inertial Fusion is currently exploring the matter of establishing a panel of outside experts to address these issues.

STATE OF SECURITY

Senator WARNER. The Department has been criticized in recent months for the security of your facilities connected with the nuclear program. Characterize for us the state of security at your facilities.

Mr. MORGAN. While the Department is not totally satisfied with the safeguards and security systems currently in place at some of our critical facilities, we are continuing to address improvements through increased management attention and commitment. The Department has made significant progress during the last year to quickly and effectively improve the safeguards and security posture at our critical facilities. We are committed to bringing our protective systems to a higher level of effectiveness. The Department supported a fiscal year 1984 supplemental request

and a sizable increase in the Department's fiscal year 1985 budget request to continue our actions to improve our safeguards and security systems. [Deleted.] DOE is satisfied with the progress to date and planned projects are underway to correct the identified deficiencies of our safeguards and security systems.

SECURITY APPARATUS

Senator WARNER. What is the threat against which you design your security apparatus?

Mr. MORGAN. A revised DOE threat policy statement was issued on January 31, 1983. Specific attention is directed to ensuring that emphasis is placed on providing a high degree of assurance to detect, identify, and inhibit the unauthorized access to nuclear weapons, nuclear test devices, significant quantities of special nuclear material, and other selected strategic materials and associated facilities. [Deleted.]

NUCLEAR SECURITY PROGRAM

Senator WARNER. General Hoover, you made the comment to staff that you thought Department of Energy security was better than Department of Defense security at their nuclear storage sites. Can you tell us why? Are there differences between the level of security provided by the Department of Energy and the Department of Defense?

General HOOVER. Perhaps that statement was made with a certain amount of bravado because I have been more acutely aware of improvements in the Department of Energy guard forces over recent months. The issue is not whether one is better than the other—the point is that all of our nuclear weapon facilities and storage sites must be adequately safeguarded and that means highly viable physical protection features and highly trained and motivated guard forces. The reason I have high expectations for Department of Energy guard forces—and we are rapidly improving but still have work to do—is that we have been able to recently hire in some of the best people coming out of elite military groups such as the Delta Force and from civilian SWAT teams. The Department of Energy will have dedicated guard forces trained and exercised over a long term period with individual commitment to a local situation. Our response forces at each site will be trained, equipped, and qualified physically commensurate with elite military forces and furthermore committed day-in and day-out to a specific Department of Energy site. Given those circumstances, I cannot help but believe that over the long term [deleted].

[Deleted]. The Department of Energy will have inherently a capability second to none to secure nuclear weapons and related research, development, testing, and production facilities. However, highly trained and motivated guard forces must be augmented by the necessary physical protection features and warning devices—such as requested in our fiscal year 1985 funding request. Your support is necessary now and in the outyears.

SECURITY

Senator WARNER. Dr. Wagner, since you represent the DOD, do you agree with General Hoover that DOE facilities are better secured than DOD facilities?

Dr. WAGNER. I do not agree. I believe that both types of facilities have adequate security, but it is questionable whether a Department of Energy facility is "more" secure than the Department of Defense facilities. The reason for this is: [Deleted]. However, I also believe the professional guard force at Department of Energy facilities is fully capable of providing security that responds adequately to the conditions at Department of Energy facilities, and we should not attempt to make direct comparisons of which is somehow "better" when each serves well to meet different needs.

Senator WARNER. I might suggest that this is an area where the two Departments should collaborate. Both should be securing nuclear weapons facilities to the same standards against the same threat. I don't need to remind you gentlemen of the consequences of a breach in nuclear security. Dr. Wagner, could you use the Military Liaison Committee to look into this issue in greater detail to insure that security is adequate?

Dr. WAGNER. It is extremely difficult to compare Department of Defense and Department of Energy nuclear storage facility security because the threat, criteria, vulnerabilities, and immediate purpose of the weapons is so varied. Department of Defense nuclear storage facilities in the United States are guarded by military personnel for the most part and generally are located on military reservations. Weapons stored overseas are considered to be more vulnerable bacause of the potential

threat and are subjected to both Department of Defense and/or NATO/Military criteria which requires military forces to secure the weapons. It should be noted that deployed weapons are "full-up" weapons and are ready for immediate employment, given proper authorization. Not only are weapons protected against peacetime terrorist-type threats; they must also be protected during crises or transition to war and wartime periods where the threat becomes military in nature. For these reasons, a direct comparison between Department of Defense and Department of Energy security, while interesting, is inappropriate. However, the Departments do collaborate along formalized lines. Each participates on the other's Security Steering Group, and both Departments are members on a security forum at the NSC. Exchange of security information and ideas is conducted on a continuing and routine basis through these channels, which I believe serve more appropriately than would the Military Liaison Committee.

PROTECTION PROGRAM STATUS

Senator WARNER. What was the outcome of the review of security procedures at various Department of Energy facilities?

Mr. MORGAN. During the past 18 months, the Headquarters Inspection and Evaluation team has inspected selected protective elements at each of our field offices. These reviews examined the overall effectiveness of the safeguards and security programs at our most critical facilities.

Recently, Headquarters has conducted reviews at Oak Ridge, Tennessee, and Savannah River, South Carolina. [Deleted.] Additionally, programs are in effect at all critical DOE facilities to systematically review and upgrade safeguards and security systems to assure that the current postulated threat can be met. [Deleted.]

TERRORIST THREATS

Senator WARNER. The threat of terrorism is dynamic and it is growing. Are you satisfied that the security arrangements you are making can respond to the full spectrum of terrorist threats?

Mr. MORGAN. The Department is not totally satisfied with the safeguards and security systems currently in place at some of our facilities. As a result, we are continuing to make improvements to bring our protective systems to a higher level of effectiveness [deleted].

We recognize, of course, that even with dramatic physical protection enhancements, we still will not be able to ensure absolute security. However, with effective personnel reliability programs, physical protection components, effective command and control, and professional guards who are well trained to protect our sites, we are convinced that our sites will have a reasonable assurance of deterring the postulated adversary.

PROTECTIVE FORCE TRAINING

Senator WARNER. What sort of training regimen do these organizations conduct to maintain their proficiency?

Mr. MORGAN. DOE's protective force officers receive training in basic security operations that is tailored to the specific facilities and program activities and materials at each location. This basic training includes firearms proficiency, self-defense, riot control, communications procedures, and operation and use of other security equipment such as metal and special nuclear material detectors. In addition to basic training, DOE has been providing training in several areas directly focused on the terrorist threat. The thrust of this specialized training is to prepare protective forces to effectively counter an armed attack. Specific training provided includes the use of Multiple Integrated Laser Engagement Simulation (MILES) equipment for more realistic force-on-force tactical experience; classroom lectures on DOE's Federal law enforcement authority; special weapons and tactics training in which we are assisted by the Los Angeles Police Department; and we develop and furnish training modules (videotapes) for use by our contractor training officers for site-specific tactical exercises.

In order to assure more uniformity and consistency in our protective force training, DOE is planning to establish a Central Training Academy, situated on Kirtland Air Force Base in Albuquerque, NM, to provide basic and advanced tactical training for our protective personnel.

SECURITY OBJECTIVES

Senator WARNER. What areas of technology development are requested in this budget that will enhance security objectives?

Mr. MORGAN. Areas of technology development in this budget that will enhance security objectives include intrusion and contraband detection, advanced access denial techniques, and materials control and accountability instrumentation for measurement and surveillance of strategic materials. [Deleted] and to assure that the research and development activities are relevant to the overall threat guidance, policy, and objectives.

WASTE REMOVAL FROM SINGLE SHELL TANKS

Senator WARNER. What is the status of plans for removal of waste from single shell tanks at Savannah River and Hanford?

Mr. MORGAN. There are eight single-shell tanks at Savannah River. At times the base of source of these tanks has been at or below the water table. It is planned to complete the removal of all waste from these tanks in fiscal year 1988.

There are 149 single-shell tanks at Hanford. The climate is arid, and the base of the waste tanks is several hundred feet above the water table. The tanks contain saltcake, sludge, and liquid. It is planned to stabilize the waste tanks by removing all pumpable liquid to the extent practical and then to isolate them by sealing off all penetrations to prevent the inadvertent reentry of liquid. It is planned to complete these operations in fiscal year 1989.

Final decisions on the terminal storage of the saltcake, sludge, and interstitial liquid remaining in the tanks have not yet been made and are being determined through the NEPA process. It is planned to issue the final environmental impact statement and make the decision in late fiscal year 1985 or early fiscal year 1986. The basic alternatives are terminal storage of the waste in the waste tanks where it is now, or retrievability of the waste and disposal elsewhere.

WASTE ISOLATION PILOT PLANT PROJECT FUNDING

Senator WARNER. There is a reduction of $52 million for the Waste Isolation Pilot Plant project. Can the 1988 target for operation be met?

Mr. MORGAN. The peak construction period for the WIPP project is the 1984-1985 period. Development of the project and its system interfaces must continue as planned to maintain the cost/schedule success of the project to date. Any additional reduction of funding could adversely impact both costs and schedules for completion of the WIPP facility and system. A definitive impact of such a reduction will be available in May when the final design estimate is complete.

DEFENSE WASTE MANAGEMENT PLAN

Senator WARNER. The President signed the Defense Waste Management Plan in June of 1983. Would you outline for the committee the goals of this plan?

Mr. MORGAN. This document describes a workable approach for the permanent disposal of high-level and transuranic waste from atomic energy defense activities. The primary goal of this program is to utilize or dispose of high-level and transuranic waste routinely, safely, and effectively. This goal will include the disposal of the backlog of stored defense waste and newly generated waste. The strategy for defense transuranic and high-level waste disposal encompasses a sequential approach starting with priority need; phasing of facilities to levelize budget; maximizing utilization of existing facilities and pilot plants; treating only problems, e.g., utilizing in-place stabilization where possible; maintaining only temporary working inventory at minor DOE transuranic waste generators; using the Waste Isolation Pilot Plant for TRU waste disposal and a commercial repository for high-level waste disposal. Flexibility exists in the plan for using a defense-only repository.

PROCESS EXPERIMENTAL PILOT PLANT

Senator WARNER. The Process Experimental Pilot Plant will demonstrate different experimental approaches for processing transuranic waste. Would you explain these approaches to the committee?

Mr. MORGAN. The objective of different experimental approaches is to utilize off-the-shelf, commercial equipment. The waste is first shredded, container and all, in a slow speed shredder used in the aluminum recycling industry. In the next process the combustible materials are burned in a rotary kiln incinerator. Immobilization of

the waste is achieved in the last process using industrial concrete mixing equipment.

CANISTER FABRICATION DEMONSTRATION

Senator WARNER. Are there any plans to utilize contaminated scrap at Oak Ridge for the Canister Fabrication Demonstration Activity?

Mr. MORGAN. Most of the 80,000 tons of scrap metal at Oak Ridge is carbon steel and resulted from upgrading efforts at the Department's three gaseous diffusion plants. Since the Canister Fabrication Demonstration Facility, located at the Idaho National Engineering Laboratory, will require stainless steel whose chemical content must meet rigid specifications, the scrap at Oak Ridge would not be suitable for such an application.

We plan to recycle the Oak Ridge scrap by smelting it into shielding blocks for use at the Department's High Energy Accelerator facilities. The Office of the Assistant Secretary for Energy Research requires about 100,000 tons of shielding material, over the next 10 years, as part of its beam energy upgrading programs at the accelerator facilities. The program will be able to obtain shielding materials at costs comparable to or less than it would pay in the commercial markets. Second, Defense Programs will be able to recycle this material at a cost comparable to or less than that which would be required to bury it. Third, we will be able to avoid wasting a valuable national resource and avoid consuming burial ground space. We anticipate that this program will bring credit to the government for effective management of its resources.

L REACTOR RESTART

Senator WARNER. What is the current status of the L Reactor startup at Savannah River?

Mr. MORGAN. During fiscal years 1981 through 1983 L Reactor was upgraded to a status equivalent to the three operating reactors for startup originally planned for October 1983. Public Law 98-50 and the judgment in the lawsuit concerning the L Reactor restart required preparation of an Environmental Impact Statement prior to restart. The draft EIS was issued in September 1983, and the final EIS is expected in April 1984. The Department is currently conducting negotiations with the State of South Carolina for a cooling water discharge permit for L Reactor in accordance with the Clean Water Act. Also, we are considering the construction of a 1,000-acre cooling lake prior to restart as the preferred alternative for the reactor effluent thermal mitigation required to obtain the permit. The schedule for restart will be determined following publication of the Record of Decision in May 1984. The 1,000-acre cooling lake construction is expected to take about 6 months, and we plan to be able to restart the reactor early in 1985.

MATERIAL PRODUCTION REQUIREMENTS

Senator WARNER. Would you outline for the committee the schedule that must be met for increased materials production necessary to meet our weapons production requirements.

Mr. MORGAN. Current production activities, plus planned initiatives, will [deleted] meet the plutonium and tritium requirements [deleted.]

The planned initiatives to increase production of nuclear materials include restart of L Reactor early in 1985, conversion of the Savannah River production reactors producing plutonium to a slightly enriched uranium loading beginning in the fourth quarter of fiscal year 1986, and initiation of Special Isotope Separation prototype operations in fiscal year 1989 with full production operations by fiscal year 1992.

FISCAL YEAR 1984 SUPPLEMENTAL REQUEST FOR SECURITY

[Deleted.]

MARK 15 CONVERSION

Senator WARNER. There are funds requested for conversion to Mark 15 cores at Savannah River. How will this conversion impact on our national security?

Mr. MORGAN. Conversion of those Savannah River production reactors producing plutonium to a slightly enriched uranium, Mark 15, core loading, beginning in the fourth quarter of fiscal year 1986, would add [deleted] weapon-grade plutonium to the Department of Energy stockpile during 1987-1999. [Deleted.] For this reason, the proposed conversion to a Mark 15 loading will enhance national security. Other al-

ternative core loadings are also being evaluated, including the natural uranium Mark 22s/25. These core loadings would be less costly than the Mark 15; however, they do not provide as much increase in production, [deleted].

NEW PRODUCTION REACTOR

Senator WARNER. What is the status of plans for a New Production Reactor (NPR)?

Mr. MORGAN. DOE has initiated studies with the objective of compiling data and performing analyses for a mid-1985 recommendation to the President of both a reactor concept and a site for construction of the NPR. The NPR tasks we have started are in four principal areas: preparation of cost estimates that are reactor concept specific and site specific, development of technology assessment and safety studies, evaluation of required support facilities, and compilation of environmental data. This is necessary in order that the NPR issue can be considered fully during the fiscal year 1986 budget cycle. Also, an NPR project office has been established at DOE Headquarters to manage the study activities.

With regard to the need date for the NPR, additional studies are currently ongoing aimed at reducing the uncertainty concerning the useful lifetimes of the existing Savannah River reactors and the Richland N Reactor. [Deleted.]

Although it previously has been possible to perform most of the NPR work using a combination of operating contractors at the candidate sites, temporary technical working groups, and special committees, we have reached the point where substantial additional support and expertise is required. We are planning to proceed promptly to obtain this specialized support assembling cost data and preparing the necessary reactor concept specific and site specific cost estimates to permit comparison of the alternatives on a uniform basis, performing safety analyses including risk assessments, and preparing environmental documentation.

Senator WARNER. How much money is being requested for environmental impact statements?

Mr. MORGAN. The preparation of the NPR environmmental impact statement is estimated to cost approximately $3.5 million. The total effort involved in the data gathering process, including all of the necessary concept development, site evaluation, and cost estimates over the next 2 years is $22.5 million.

REDUCTIONS TO ORIGINAL REQUEST

Senator WARNER. What reductions, if any, are being made by the Department of Energy in the original amount requested for Materials Production, and what is the impact of any such cuts?

Mr. MORGAN. The Department of Energy is not requesting any reductions to the budget request we currently have before you. The Department would only plan to reduce its request if the Department of Defense, in its current effort to reduce defense spending, made decisions that resulted in slippage of weapons systems that would in turn affect annual requirements for plutonium and tritium.

NEW PRODUCTION REACTOR

Senator WARNER. What sites are candidates for a New Production Reactor?

Mr. MORGAN. The three principal candidate sites being evaluated are: the Savannah River Plant, Aiken, South Carolina; the Hanford Reservation, Richland, Washington; and the Idaho National Engineering Laboratory (INEL), Idaho Falls, Idaho. In addition, we are reviewing other Department of Energy sites in enough detail to establish how fully they must be evaluated in the NEPA process.

Senator WARNER. Will a New Production Reactor also produce electrical power?

Mr. MORGAN. Two of the three reactor concepts under consideration will have the design features to efficiently produce byproduct steam that could be sold to a utility to produce electrical power. They are the High Temperature Gas Cooled Reactor (HTGR) and the Light Water Reactor (LWR). The current Heavy Water Reactor (HWR) design does not lend itself to efficient and cost effective power production. Studies and comparisons are currently underway to examine the range of problems and benefits associated with power production while maintaining the primary project goal of tritium production. This data will be factored into the reactor concept and site recommendations in mid-fiscal year 1985.

Senator WARNER. How much will a new reactor cost?

Mr. MORGAN. Preliminary estimates for the total cost of the NPR range from $3 to $6 billion based on past studies of the concept and the sites. A cost estimate study is currently planned to provide more detailed and comparable cost estimates that

will include consideration of specific differences in reactor concepts and sites. This information will be prepared by an independent contractor based on design data supplied by the concept proponents and the sites. It should be available by mid-1985.

Senator WARNER. How much is in your fiscal year 1985 budget to pursue this New Production Reactor? Is it enough?

Mr. MORGAN. The total cost for these NPR studies through mid-1985 is estimated to be $22.5 million—$17.5 million in fiscal year 1984 and $5 million in fiscal year 1985. The estimated NPR fiscal year 1985 budget of $5.0 million will be needed to complete ongoing work on reactor concepts, safety, site characterization studies, environmental studies, and cost estimate studies. The fiscal year 1985 funding is expected to be adequate to complete the work needed for the Secretary of Energy to make a recommendation to the President regarding the reactor concept and site for the NPR and to allow the NPR to be considered in the fiscal year 1986 budget.

COOPERATIVE RESEARCH

Senator WARNER. Dr. Wagner, the DOD has budgeted $10M for the DOE labs to work on conventional warheads. What research objectives are you hoping to get the DOE Labs to accomplish?

Dr. WAGNER. The general goal is to bring about major improvements in nonnuclear munitions technology across all Services mission areas. The emphasis is on next generation munitions. A key objective is to make major improvements in their lethality. A large fraction of the people, the facilities, and the innovative expertise that Los Alamos, Livermore, and Sandia have developed in their pursuit of excellence in nuclear weapons research, development, and testing is equally applicable to conventional munitions. This capability nicely complements the Department of Defense laboratories and industrial technology bases. In keeping with recommendations of the recent Packard study and the subsequent Presidential memorandum, I have encouraged the Department of Energy to increase their funding of technology base efforts that are mutually beneficial to the Department of Defense nonnuclear programs and the Department of Energy nuclear research.

We plan that the Department of Energy laboratories will focus their conventional munitions relevant technology base on the following: (1) The four generic warhead technologies of kinetic energy penetrators, shaped charges, and blast/fragment warheads; (2) Theoretical and experimental development of explosives and detonators; (3) advanced fuzing and target sensing concepts; (4) "Soft kill" [deleted] pulsed microwave and EMP warheads; (5) Terminal ballistics; (6) Advanced armors; (7) Vulnerability/lethality methodology and experimentation; (8) Munitions systems effectiveness and sensitivity analyses; (9) Foreign/domestic munitions technology assessment; and (10) Nuclear/nonnuclear weapons effectiveness comparisons.

The Deputy Under Secretary of Defense Research and Engineering for Tactical Warfare Programs and his Office of Munitions will eatablish priorities and define thrust areas in a concerted planning effort with the Service and Department of Energy laboratories.

COOPERATIVE RESEARCH

Senator WARNER. Mr. Morgan, what is your position on this cooperative research effort; would you be willing to earmark DOE funds to support this effort?

Mr. MORGAN. I am very enthusiastic about using the tremendous technical capabilities of our nuclear weapons laboratories to bring about improvements in nonnuclear military technologies. To this end, we already are doing work on a reimbursable basis for the Department of Defense in support of nonnuclear military technology.

With respect to earmarking Department of Energy funds for this, our primary missions have been and must continue to be the research, development, and testing of nuclear weapons and continuing the advancement in nuclear weapons technologies. Our budget request for weapons research, development, and testing is the minimum needed to carry out these tasks. Earmarking Department of Energy funds at this time for nonnuclear munitions work would detract from our ability to accomplish our primary missions; however, since the nuclear weapons and nonnuclear munitions technologies are somewhat synergistic, considerable support in high explosive and materials technology is provided to the nonnuclear areas by research performed for the nuclear program.

W82 (155MM ARTILLERY SHELL)

Senator WARNER. Dr. Wagner, in your prepared statement there is a good discussion of the W82. As I understand it, you are complying with the direction of Congress to kill the W82, but you would like to revisit the issue at some point. Is that accurate?

Dr. WAGNER. Yes, we plan to revisit the 155mm issue. There is a critical need for a modernized 155mm round to maintain deterrence; the W82 round is superior to the current W48 round in military effectiveness, survivability, and accuracy. [Deleted.] In his testimony to the House Armed Services Committee on March 6, SACEUR strongly recommended that resources be devoted to producing a modernized 155mm round for deployment in Europe. The Department of Defense report to Congress on the nuclear posture of NATO, to be submitted by May 1, 1984, will reaffirm the need for the W82 round, and we intend to request that the Congress reconsider funding for the W82 in the context of that report.

Senator WARNER. Is the design and testing of the W82 complete? How long would it take to put the warhead into production once the go ahead was given?

Mr. MORGAN. The Department of Energy has terminated production activities on the W82 program and has directed the Sandia National Laboratories and the Lawrence Livermore National Laboratory to terminate development activities by the end of fiscal year 1984. [Deleted.] The driver governing the time to restart production is the $50 million in construction funding for production facilities for the W82 which was rescinded by Congress in fiscal year 1984. Additionally, about $20 million of research and development operating funds and the same amount in production and surveillance funding would be required. It will take four to five years to achieve the first production unit after Department of Energy funding is made available.

SOVIET BREAK-OUT POTENTIAL

Senator WARNER. [Deleted.]
Mr. MORGAN. [Deleted.]

PROGRAM LIMITATIONS

Senator WARNER. Is the current Strategic Defense Initiative constrained primarily by technological limitation or is it limited by funding constraints?

Mr. MORGAN. At this point, the initiative really is constrained by both factors. Many aspects of the technology have yet to be adequately defined and understood. As far as funding is concerned, we believe our fiscal year 1985 request is optimally balanced considering the state of the technology, overall priorities within the weapons program, and the total funding available to meet these priorities.

EARLY DEPLOYMENT OPTIONS

Senator WARNER. If the United States decided to deploy a strategic defense system on an accelerated basis, what, in your view, would be the most promising candidate technologies? How effective could such a system be and how quickly could it be deployed?

Mr. MORGAN. [Deleted.] There are several promising concepts which might contribute to the development of a comprehensive defense system in the future. A focused, long-term research effort is needed to determine the feasibility of these concepts and to provide information upon which to base decisions about concept selection and system development. We are doing the necessary research and are accelerating and focusing the effort under the auspices of the Strategic Defense Initiatives. We expect to be able to determine the feasibility of these concepts in the 1990's. [Deleted.]

ASSESSING SOVIET CAPABILITIES

Senator WARNER. [Deleted.]
Mr. MORGAN. [Deleted.]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

L REACTOR RESTART

Senator THURMOND. What is the current status of the L Reactor restart at Savannah River?

Mr. MORGAN. L Reactor has been upgraded to a status equivalent to the three operating reactors, and startup was originally planned for October 1983. Public Law 98-50 and the judgment in the lawsuit concerning the L Reactor restart required preparation of an Environmental Impact Statement prior to restart. The draft EIS was issued in September 1983, and the final EIS is expected in April 1984. The Department is currently conducting negotiations with the State of South Carolina for a cooling water discharge permit for L Reactor in accordance with the Clean Water Act. Currently, the construction of a 1,000-acre cooling lake prior to restart is being planned by the Department as the preferred alternative for the reactor effluent thermal mitigation required to obtain the permit. The schedule for restart will be determined following publication of the Record of Decision in May 1984. However, we hope to complete the lake and to be able to restart the reactor in early 1985.

Senator THURMOND. What determination did the State of South Carolina make in regard to the plan for a cooling pond for the L Reactor?

Mr. MORGAN. The Department of Energy proposal to construct a 1,000-acre cooling lake prior to restart and adjust reactor operation, if necessary to maintain a balanced indigenous population of wildlife in the lake, has been favorably received by the State of South Carolina. On this basis, DOE is proceeding to incorporate this approach into the final Environmental Impact Statement as the preferred thermal mitigation alternative.

Senator THURMOND. What happens to our weapons program if L Reactor is not brought into production?

Mr. MORGAN. If L Reactor is not restarted, the production of weapon-grade plutonium during the fiscal year 1985 to fiscal year 1999 planning period would be decreased [deleted].

NEW PRODUCTION REACTOR

Senator THURMOND. What is the status of plans for the New Production Reactor (NPR)?

Mr. MORGAN. [Deleted.] Work is currently underway to complete data gathering on reactor concepts, safety, site facilities and environmental characterizations and estimated costs for an NPR so that Secretary Hodel can make a recommendation to the President by mid-1985. The NPR is being designed to produce tritium, although the reactor concepts under consideration would have the capability to produce plutonium, if required. We plan to have the data necessary for this issue to be considered during the fiscal year 1986 budget cycle.

Senator THURMOND. When will the Environmental Impact Statements be completed?

Mr. MORGAN. In accordance with comments from the House Armed Services Committee, preparation of an EIS has not yet been initiated. Studies to define the existing environmental baseline for the 3 concepts, that is, the heavy water reactor, pressurized water reactor, and high temperature gas-cooled reactor, are underway. Additionally, studies at the three principal candidate sites, which are the Idaho National Engineering Laboratory, the Hanford Reservation, and the Savannah River Plant, are underway to characterize these potential sites. Preparation of an EIS is expected to require approximately 12 to 18 months from the date of initiation to the Record of Decision. NEPA documentation will be prepared at an appropriate time in the concept and site decision making process.

Senator THURMOND. Has the Department of Energy revised any of the project requests for Savannah River in light of the agreement to cut defense spending?

Mr. MORGAN. The Department has not modified its fiscal year 1985 budget request for Savannah River projects.

Senator THURMOND. I noticed that there has been a reduction of $40M dollars in the net cost estimate for the Defense Waste Processing Facility. Would you outline for the Committee the projected sources of these savings?

Mr. MORGAN. The estimated cost for the Defense Waste Processing Facility, DWPF, has been reduced from $910 million last year to $870 million this year. The $870 million is based on a newly revised cost estimate. Because the project is going well and is now much better defined, contingency allowances have been significantly reduced. The projected escalation has also been reduced. In addition, the scope of the project has been revised to include items that were originally planned for a follow-on project, Stage 2. These items are necessary to process the liquid and salt portion of the waste for disposal. Technical improvements have eliminated most of what was originally the Stage 2 requirements. However, the remaining items, which now make up about 10 percent of the DWPF project, are necessary to provide a complete facility to handle both sludge and salt waste. With these additions, a future

Stage 2 will not be necessary. This additional scope combined with the greatly reduced escalation and contingency allowances result in the net reduction of $40 million. We will continue to pursue opportunities to reduce the cost even further during the construction phase of the project.

SECURITY AT SAVANNAH RIVER

Senator THURMOND. Following the review of security at Savannah River, what initiatives have been taken to improve the security there?

Mr. MORGAN. [Deleted.] Savannah River and DOE initiated immediate action to replace the existing operating contractor guard force. A security services contractor, Wackenhut Services, Inc., was selected by DOE in August 1983. Security SWAT-type personnel on loan from the DOE sites were placed on the Savannah River Plant site to augment the existing guard force until the Wackenhut force could assume full security responsibilities in February 1984. The new guard force training program was intensified and expanded. An Advanced Tactical Training Area was constructed onsite providing tactical stress course and training facilities for all types of weapons used at the Savannah River Plant. A major reorganization was initiated within the Savannah River Operations Office which resulted in the expansion and improved management of the safeguards and security function, including direct reporting to the Office of the Manager.

Direct meetings were held by Secretary Hodel and other Department officials with corporate management of the operating contractor, E. I. Du Pont de Nemours, for the purpose of affirming the expected role of the operating contractor in fulfilling safeguards and security policies at Savannah River. For example, Du Pont initiated a massive security awareness and education program for its 10,000 employees, including signed pledges by each individual to dedicate themselves to good security practices. This program was supported by Du Pont top management at the Savannah River Plant.

[Deleted.]

PROFICIENCY OF A CIVILIAN PROTECTIVE FORCE

Senator THURMOND. Do you feel that a civilian organization can maintain the level of proficiency necessary to handle the spectrum of terrorist threats to Savannah River?

Mr. MORGAN. We believe it is possible for a civilian protective force to maintain a proficiency to mitigate the postulated threat at Savannah River.

Through advanced training and tactical team development, Savannah River is able to provide a cadre of individuals whom I feel are comparable with the military. In fact, many of our protective force officers have had combat training while in the military. As civilians, these individuals do not rotate assignments periodically as occurs in the military services. I believe this aspect is essential for maintaining continuity of the protective force at Savannah River and at other DOE facilities. Finally, by utilizing a civilian protective force, we are able to maintain more effective command and control in the event of an adversarial incident.

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

INERTIAL CONFINEMENT FUSION

Senator EXON. We understand that the actual funding for the Laboratory for Laser Energetics in their Five Year Contract with the Department of Energy was approximately $4,000,000 less than the projected contract amount. Is it not true that had the program been funded at the original contract amount, that the full 24-beam system could have been converted to the ultraviolet within fiscal year 1984? Is it not true that far more students could have been trained at Rochester and more effective use made of the facility had the program been funded at the contract amount?

Mr. MORGAN. During fiscal years 1980 through 1984, the actual Department of Energy (DOE) support of inertial fusion research at the University of Rochester Laboratory for Laser Energetics was approximately $4,000,000 less than the $39,200,000 estimated originally in 1980. The difference resulted not from changing priorities; rather, appropriations for the total inertial fusion program during that period were less than anticipated when the agreement was formulated. The agreed contract was contingent on congressional authorization and appropriation.

The real value of ultraviolet conversion of the 24-beam OMEGA system has been understood by the scientific community only within the last two or three years. So

in early fiscal year 1983, well after the start of the Rochester contract, the contract was modified to allow conversion of six OMEGA beams in order to demonstrate fully the expected utility of frequency tripling. We believe the utility has now been demonstrated and are supporting conversion of the full OMEGA system as rapidly as funds allow, consistent with maintaining a balance throughout the national inertial fusion program.

With additional fiscal support from the DOE, the University of Rochester could have trained more students and could have used more effectively the DOE-provided facilities; however, given the tight budgets and management constraints of the past few years, we believe that DOE support of all program participants reflects a balanced effort that optimizes the productivity of the entire national inertiai fusion program.

Senator EXON. Have the National Laboratories, in particular Los Alamos and Lawrence Livermore, benefited from the research at the Laboratory for Laser Energetics? What has been the impact of the Laboratory for Laser Energetics-developed frequency-tripling scheme on the National Program and plans for the NOVA laser?

Mr. MORGAN. The research at the Laboratory for Laser Energetics has benefited all participants in the Inertial Fusion Program. The most significant contribution recently by the Laboratory for Laser Energetics has been its development of a viable frequency-tripling technique. This technique will be implemented on the NOVA laser, scheduled for completion later this year. Although the exact impact of frequency-tripling is unknown, recent experiments indicate that frequency-tripling offers a substantial improvement in fusion target interaction performance. Although the bulk of the Rochester research primarily supports the glass laser program at Lawrence Livermore National Laboratory, Rochester's work in plasma physics and diagnostics development also applies more generally to the gas laser program at Los Alamos National Laboratory and to the particle beam program at Sandia National Laboratories.

Senator EXON. We understand that a review panel was appointed by the Department of Energy to evaluate the third harmonic performance of the first 6-beam lines of the OMEGA system at the University of Rochester. What were the findings of that review group?

Mr. MORGAN. In May 1983, a set of seven performance criteria was established to ensure that further conversion would be warranted. In November 1983 with the support of technical experts drawn from the program, the Office of Inertial Fusion reviewed the performance of the 6-beam OMEGA modification. After careful consideration of the presented data, it was determined that the established criteria had been satisfied and that conversion of the remaining 18 beams should be undertaken. The Department of Energy has given that approval, and the conversion will proceed at a pace consistent with available funds.

Senator EXON. We understand that since 1971 the Laboratory for Laser Energetics program has received $108,000,000 in funding, with 48 percent of this amount from non-Federal sources. Is it not true that this represents the largest non-Federal investment in inertial fusion research in this country, which has helped to make the Federal investment in the Rochester facility more effective?

Mr. MORGAN. You are correct. The University of Rochester Laboratory for Laser Energetics has attracted a significant level of non-Federal support for inertial fusion research. The Department of Energy has encouraged the University of Rochester to seek non-Federal sponsors since their support helps make the Federal investment in the Rochester program more effective and stimulates highly desirable cross-fertilization between the academic and industrial communities in research underlying the scientific and technological base related to inertial fusion. The academic environment of the University of Rochester contributes to the unique capabilities of the Laboratory for Laser Energetics and provides an ideal setting for research in basic scientific areas related to inertial fusion.

Senator EXON. The Laboratory for Laser Energetics has an independent Research Advisory Board made up of distinguished scientists and representatives from industries, universities, and the national laboratories. Professor M. Rosenbluth (University of Texas) and Dr. J. Barnes (Los Alamos National Laboratory) are particularly knowledgeable in weapons physics and plasma physics and their applications to the National Defense Programs. Drs. H. Hurwitz (General Electric Co.) and H. Forsen (Bechtel Group, Inc.) are both distinguished scientists knowledgeable not only in national defense areas, but in all applications of nuclear technology, particularly those of interest to industry. What use is the Department of Energy making of the advice and annual reports of the Board?

Mr. MORGAN. We are well aware of the individuals who serve on the University's Research Advisory Board, and we consider their advice and comments regarding the

inertial fusion program. For example, we concur with the Board's recommendation that the University should convert the full 24-beam OMEGA system to frequency-tripled operation as rapidly as possible. Unfortunately, we are not always able to fully implement their advice.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

INERTIAL CONFINEMENT FUSION

Senator LEVIN. General Hoover, do you feel that the technical progress in the Inertial Confinement Fusion program is satisfactory?

General HOOVER. The inertial confinement fusion program is making important scientific contributions today and we are gathering the necessary data, some of which is contingent on facilities yet to be completed, to support comprehensive assessment of the technical progress of the program in reaching its near- and long-term goals by the scientific community in the 1987 time frame. From my perspective as Deputy Assistant Secretary for Military Application, the program continues to make valuable contributions to increasing the understanding of [deleted] nuclear weapon designs. Of course, much of the research and development needed for these near-term military applications is equally applicable to the long-term energy goal.

Senator LEVIN. How will the Administration's budget request affect the rate of progress?

General HOOVER. We are still committed to a program evaluation in the 1987 time frame. The decrease in the operating budget request for fiscal year 1985, from that of fiscal year 1984, will result in a reduction in the number and scope of experiments that will be conducted. This means that our understanding of the relevant physics issue will be less complete than otherwise. We believe the planned program activities will still provide the basis for the technical evaluation in 2 years.

Senator LEVIN. As requested, the operating budget for the ICF program in fiscal year 1985 represents a decrease of 18.3 percent from fiscal year 1984's operating budget, even after the effects of inflation are excluded from the calculations. Doesn't this mean that the national weapons laboratories and their supporting facilities will have to significantly reduce their staffs in the ICF program and their ICF levels of effort in fiscal year 1985?

Mr. MORGAN. The level of effort in fiscal year 1985 will be reduced most significantly at one of our national laboratories, the Los Alamos National Laboratory, primarily due to ending the evaluation of the carbon dioxide laser as an inertial fusion driver earlier than planned. Other laboratories and supporting facilities would be reduced 6–7 percent from the fiscal year 1984 level of effort. Regarding manpower, a reduction commensurate with the reduced operating funding level is projected for Los Alamos National Laboratory. Manpower levels at the Lawrence Livermore National Laboratory are expected to decline due to the completion of the NOVA facility early in the fiscal year. Sandia National Laboratories and the support laboratories project a modest reduction from fiscal year 1984 levels.

Senator LEVIN. Won't this delay accomplishment of key experiments and other research in the ICF program needed to support the now-projected program decision in 1987 about ICF's feasibility?

Mr. MORGAN. Although the fiscal year 1985 budget levels reduce activities in some areas, we maintain our commitment for a program evaluation in 1987. Key experiments will be performed in support of this objective to build an adequate data base by 1987. The most likely result of decreased funding will be narrowing of the scope for data collection activities and a decrease in the pace of some experiments and data analysis.

Senator LEVIN. Please provide for the record a specific list of staff reductions by national laboratory and support facility, as well as a list of experiments and other research and data gathering which will not be accomplished in fiscal year 1985 if this cut is not overturned by the Congress.

Mr. MORGAN. Activities reduced in fiscal year 1985 from the progrm plan baseline include:

[Deleted.]

One-half year of ANTARES carbon dioxide laser operation at Los Alamos National Laboratory; second shift operation of the NOVA laser at Lawrence Livermore National Laboratory; and, reduced capital equipment support.

I would like to insert a table for the record showing the estimated full time equivalents by laboratory and support facilities.

INERTIAL CONFINEMENT FUSION CONTRACTOR EMPLOYMENT

[Total average full time equivalents]

	Fiscal year 1984 estimates	Fiscal year 1985 estimates
Lawrence Livermore National Laboratory	675	585
Los Alamos National Laboratory	345	222
Sandia National Laboratories	184	182
KMS Fusion, Inc	98	98
University of Rochester	60	59
National Research Laboratory	21	21
Total average full-time equivalents	1,383	1,167

Senator LEVIN. I understand that DOE asked OMB for $138 million in operating funds for ICF in fiscal year 1985, still a net program decrease but not as severe as that now being requested by the Administration. Is this correct?

Mr. MORGAN. The request to OMB for fiscal year 1985 operating expenses was $141.5 million.

Senator LEVIN. Please provide for the record DOE's proposal to OMB for ICF operating budgets for each fiscal year between fiscal year 1985 and fiscal year 1989, as well as what was granted by OMB for each of those years.

Mr. MORGAN. I would like to submit that information for the record.

INERTIAL CONFINEMENT FUSION—OPERATING EXPENSES, OUTYEAR ESTIMATES

[Dollars in thousands]

	DOE request B/A	OMB allowance B/A
Fiscal year—		
1985	$140,900	$125,000
1986	158,000	105,000
1987	165,200	75,000
1988	172,600	50,000
1989	180,000	30,000

Senator LEVIN. Why did DOE think it needed more operating funds for ICF in fiscal year 1985 than were granted by OMB?

Mr. MORGAN. In fiscal year 1982, DOE committed itself to inertial fusion program milestones that required extensive use of major inertial fusion facilities [deleted] in anticipation of a major review and decision in fiscal year 1987 concerning the direction of any future program.

The DOE budget that was submitted to OMB represented a stable, level of effort research and development program in accordance with the established inertial fusion 5-year plan, which is directed toward that fiscal year 1987 milestone. The reduced budget level proposed by OMB for fiscal year 1985 will limit the level of operation of the inertial fusion facilities, such as the ANTARES and NOVA lasers.

Senator LEVIN. Did DOE think that its nuclear weapons and civilian energy-related work would be better supported in fiscal year 1985 with these additional funds and if so in which specific ways?

Mr. MORGAN. Yes, we believed the additional funds would support a higher but reasonable rate of progress toward the established military and civilian goals of the inertial fusion program in accordance with the 5-year plan, which includes the thorough use of major inertial fusion facilities. [Deleted.] The budget request to OMB included [deleted] full operation during fiscal year 1985 of the ANTARES laser facility, which was expected to resolve in fiscal year 1985 the scientific issue of the utility of long-wavelength lasers as fusion drivers as well as to contribute to the Strategic Defense Initiatives research. At the current stage of inertial fusion research, much

of the immediate weapons-related work is equally applicable to long-range civilian energy-related goals.

Questions Submitted by Senator Jeff Bingaman

MOLECULAR LASER ISOTOPE SEPARATION (MLIS)

Senator Bingaman. I understand there has been significant progress in the MLIS plutonium process during the last year. Can you give us a few details of this progress and address the reorientation of your program that I understand in the future will be funded outside the special isotope separation line item?

Dr. Kerr. [Deleted.]

Additionally, work is proceeding on the SIS–III loop. This is a small enrichment system being constructed in existing plutonium qualified facilities at Los Alamos. The first set of lasers for SIS–III have been delivered and have exceeded operating specifications. [Deleted.]

CONVENTIONAL MUNITIONS QUESTIONS

Senator Bingaman. There is a widespread agreement on the need to raise the nuclear threshold by improving the capability of our nonnuclear munitions. What contribution could your lab make to this?

Dr. Kerr. The laboratories are currently assisting the Department of Energy through a multitude of small-scale reimbursable contracts. We believe that we could contribute much more with appropriate funding. Although the development of nuclear weapons must remain our prime responsibility, it is essential that a stable funding base be established for nonnuclear weapons so that the laboratory can apply its capabilities in an effective manner.

Senator Bingaman. What are some of the science and technology areas where your lab could contribute significantly to nonnuclear munitions?

Dr. Kerr. A large fraction of our nuclear weapon technologies and facilities have direct application to nonnuclear weapons, and a significant fraction of the country's expertise in some areas exists at the Department of Enegy weapon laboratories. Some of these areas are: high explosives; plasma physics; materials; arming, fuzing; hydrodynamics; lasers; and large-scale computer applications.

Senator Bingaman. Does the Atomic Energy Act need to be amended to allow the Department of Energy mission to the expanded to cover nonnuclear weapons research and development at the labs?

Dr. Kerr. The Secretary of Defense has proposed that the Department of Energy in coordination with the Department of Defense establish level-of-effort funding for the Department of Energy weapon laboratories to pursue nonnuclear weapon research and development. This is an extension of the Department of Energy mission and should be recognized by the Congress in an appropriate fashion.

Senator Warner. Before we adjourn, I would like to include for the record a statement by the Laboratory for Laser Energetics, University of Rochester, Rochester, NY.

[The statement follows:]

Prepared Statement by the Laboratory for Laser Energetics, University of Rochester, Rochester, NY

INERTIAL CONFINEMENT FUSION PROGRAM AT THE UNIVERSITY OF ROCHESTER

The University of Rochester's Program in inertial fusion is comprised of three distinct and complementary components: the DOE research program in direct-drive, operation of the facility for users (through National Lasers Users Facility (NLUF)), and the Laser Fusion Feasibility Project. More than $108,000,000 have been invested in the research programs, of which 48% had been derived from non-federal sources. Over $37,000,000 have been invested in building and laboratory equipment. Our current annual operating budget is about $9,000,000 of which salaries and their related benefits account for 60% of the total operating costs. The Laboratory for Laser Energetics (LLE) at the University of Rochester is both a cost effective and highly productive research center.

The purpose of the Rochester program is to support and enhance the DOE Military Applications program by providing laser-matter interaction data, capsule physics, and laser and optical engineering. During FY83, LLE made extraordinary

progress in demonstrating the advantages of short-wavelength lasers for efficient coupling to fusion targets. Experiments at LLE with both the 24-beam, infrared (1054-nm) OMEGA facility and the single-beam, ultraviolet (351-nm) Glass Development Laser (GDL) have concentrated on the basic physics of coronal coupling, energy transport, and uniforminty for short-wavelength, direct-drive laser fusion. This has been especially beneficial for providing some of the critical data, not otherwise available, needed to meet the milestones of the National Inertial Fusion Program.

Rochester was first to demonstrate and patent the High-efficiency, frequency-tripling process. This is now used in virtually every short-wavelength inertial fusion laboratory and has made glass lasers a potent research tool to achieve success in inertial fusion. A major highlight of the fiscal year 1983 program was the completion of the conversion of the first six, ultraviolet (351-nm) beams of the OMEGA system. The initial six-beam conversion and experiments were completed on-time and on-budget and exceed all the performance criteria established by DOE, according to the DOE report. In addition to the conversion activities, the GDL and OMEGA facilities provided 1,724 and 1,182 shots, respectively, for experiments during the year; 368 target shots were conducted for user of the NLUF.

In addition to its research mission which supports the DOE weapons program, the Laboratory continues to maintain a leading role in training students; over 21 Ph.D. thesis projects are in progress now. Previously, 37 students have completed their Ph.D. research at the Laboratory.

In fiscal year 1984 an additional six OMEGA beam lines will be converted to 351-nm operation, leaving twelve more to be converted, which we hope to do in 1985. Little additional value can accrue to the National Program unless all 24 beams are converted. In order to carry out this activity, the Rochester Program requires a total operations budget of $7.5 million of which $1.4 million will be used for the ultraviolet conversion of 12 beams and $0.6 million for the National Laser Users Facility plus $0.3 million for capital equipment. These funds are essential to fulfill LLE's scientific program. When this conversion activity is completed, we expect to perform significant, spherically symmetrical, ablative, target-implosion experiments which will help to define the conditions necessary for establishing the scientific feasibility of inertial confinement fusion. The data from these future experiments are critical to the National Program decision planned for 1987.

The demonstrated high-repetition rate and system reliability of OMEGA gives us confidence that LLE facility will continue to be a valuable and unique resource, both for the National Inertial Fusion Program and for other users of the system.

Senator WARNER. This meeting is now adjourned.

[Whereupon, at 5:23 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

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